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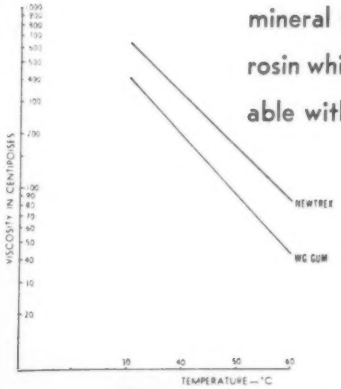

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JULY
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Formerly PAINT and VARNISH PRODUCTION MANAGER
(Established in 1910 as The Paint and Varnish Record)

VOL. 43 JULY, 1952 NO. 7

NEXT ISSUE

The application of chemical engineering principles in the manufacture of alkyd resins will be discussed in the next issue. This article will cover such important aspects as the selection, operation and control of heating systems, design and operation of agitation equipment, measurement and control of reaction, fume disposal, and the design and operation of pilot equipment.

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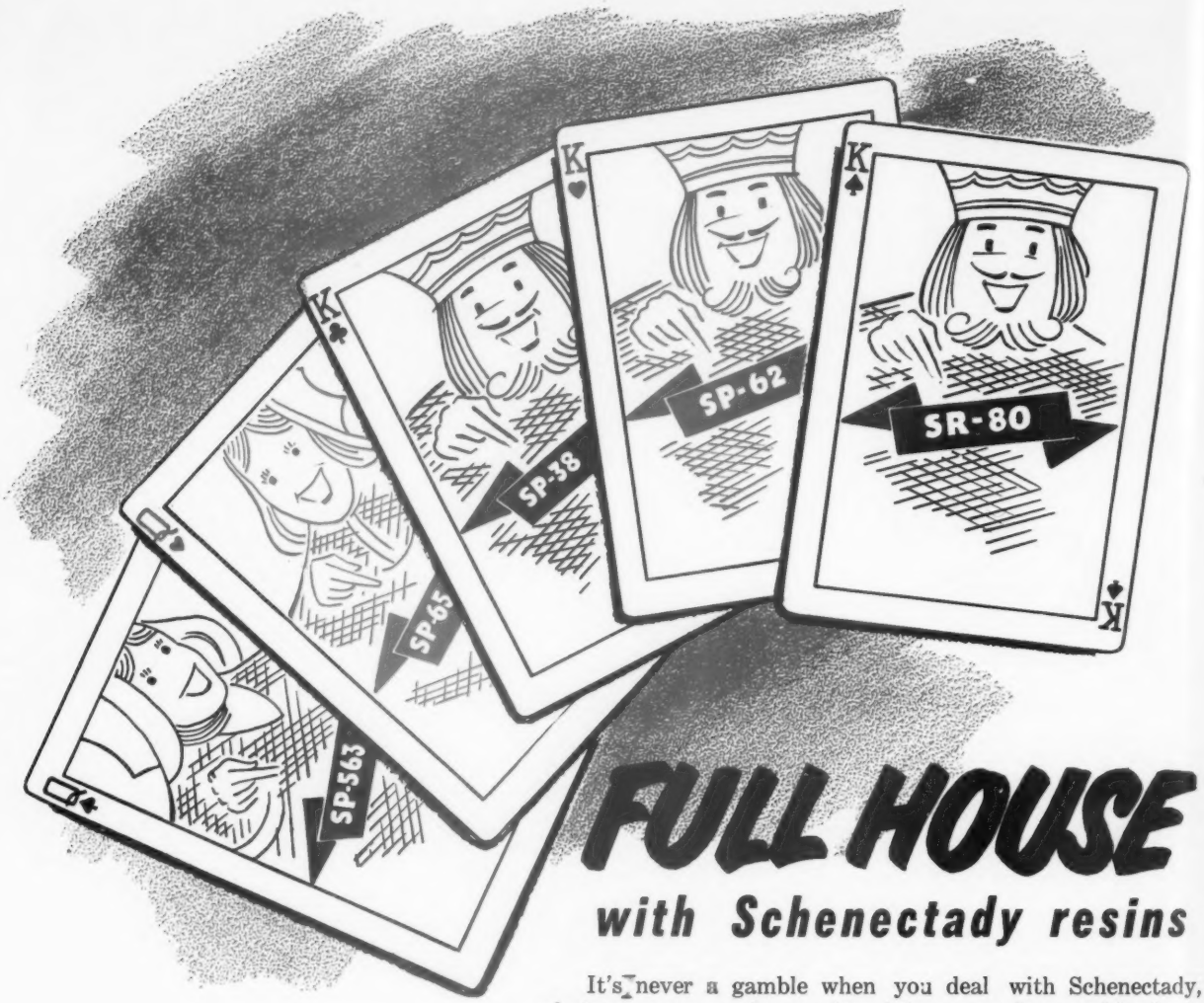

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Color (Rosin Standard)....M-
Viscosity in Centipoises (50% in Ethanol)....100-20
Specific Gravity....1.18-1.

Editorial Comment

Radioactive Test Proves Product

A GENERAL survey of the background and applications of radioisotopes was presented in the March 1952 issue. With this in mind, members of the paint industry should find of interest a recent application which was described in the April 1952 issue of "Tracerlog" the Tracerlab house organ. The special value and significance of this application lie in its many possible variations.

It seems that the Concannon Chemical Company of Cambridge, Massachusetts, in line with the widespread interest in silicones, developed a silicone-fortified liquid car polish. Because hard wax polishes have long dominated the market, it was then faced with the task of convincing dealers, and through them the public, that the new polish was not only easier to apply, requiring no rubbing, but also that it offered equal or better protection and durability. No conventional method of proof was available.

Accordingly, the company engaged Tracerlab to conduct a research program whose aim was to establish beyond doubt the efficiency of the new polish in comparison with one of the leading hard wax polishes.

Under controlled test conditions, Tracerlab radiochemists tagged quantities of both polishes with radioactive Cobalt-60 and applied the polishes to discs of metal painted with various lacquer and baked enamel automobile finishes. These samples were then subjected to a number of washes with tap water, soap and water, n-pentane, 2N sodium hydroxide and 2N hydrochloric acid. An oxygen exposure test followed by a tap water wash was also carried out. After each test a count was made of the remaining radioactive emissions.

In this way the new liquid polish was proven to yield equal or superior protection for all the finishes but one. For the latter an increase of 1% in the oil content of the polish formula was suggested. With this improvement it was clearly demonstrated that the new polish was unmistakably a better product than its competitor, the hard wax polish.

The directness of the method outlined as well as the straightforwardness of the interpretation make further comment unnecessary. It is well to point out, however, that the technique required for this type of experiment is probably the least complex of all the radiochemical techniques.

"Sniff" Test

WITH interest in "odorless" paints running high, the Scientific Section of the National Paint, Varnish and Lacquer Association has initiated a study of factors causing paint odors and methods of disposing of them.

One of the problems encountered in this study was the establishment of suitable methods for measuring and evaluating odors. These consisted of: (1) test tube comparisons with known or standard odors; (2) an osmoscope to measure threshold odor; (3) use of "sniff" cans or boxes scaled to room proportions. The human nose must be the judge in each case and it is reported that fair agreement can be obtained from a panel of ten selected people.

Aerosols on the Move

THE use of aerosol paint sprays in industry and the home is expected to grow by "leaps and bounds" within the next few years. This prediction was made by J. G. Gregory of Aeropak, Inc. and H. S. Lawton of Hercules Powder Company at the recent Chemical Specialty Manufacturers Association Meeting in Boston.

Mr. Gregory is of the opinion that by 1954 the volume of paint aerosol units will reach the 8 million mark.

Mr. Lawton reported that quick-drying, tough lacquers in a variety of colors may soon be available to the public in easy-to-apply aerosol spray containers. Leading manufacturers of home appliances and office equipment are now using aerosol spray finishes for touching-up purposes.

Improvements on containers, valves, and the product itself have lessened customer complaints.

Mr. Gregory revealed that special filling equipment has been built to make it possible to handle practically any spraying paint. Special valves have been developed for spray enamels and lacquer which decrease the clogging of nozzles, and continued research is being carried out to improve paint formulation for aerosol packaging.

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Faster processing time and brilliant color, which carries over into the finished product, are other important advantages of this improved chemical. Neo-Fat 3R has the following specifications: titer, 5°C max.; iodine value of 140 to 145; color (Lovibond 5¼") 1.2R – 12Y max.; acid value of 197 to 202; maximum unsaponifiable content 0.5%; and moisture, 0.2% maximum. Average composition is: 44% oleic, 55% linoleic, 1.0% linolenic maximum, and a trace of saturated fatty acids. Write today for technical Bulletin A-1, which gives complete information and formulas on Armour's Neo-Fat 3R.

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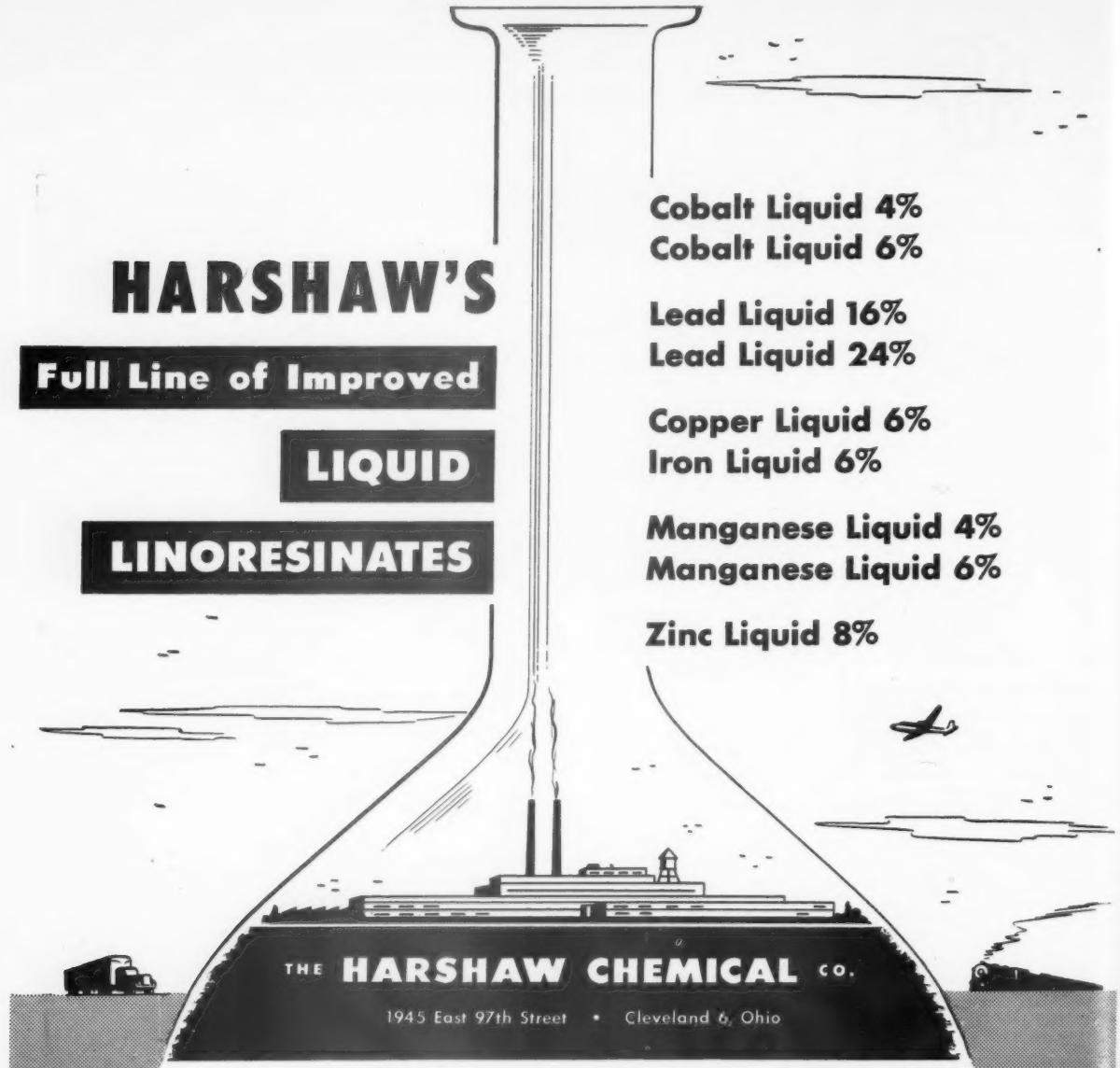

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because lead pigment stabilizes the film

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Chicago's industrial gases and rapid temperature changes, as well as Florida's moisture and sun-bake treatment, failed to permeate or crack the protective film of the "lead" paints because white lead neutralizes and stabilizes the decomposition products of the vehicle by forming stable, insoluble lead salts, giving the paint a tough, resilient film.

These exposure tests show why it pays to include "lead" in your paint formulations . . . it gives paint the "staying power" that keeps it looking fresher—longer . . . a powerful sales argument.

For detailed information on the most effective use of "lead" in your paints . . . write to *Lead Industries Association, 420 Lexington Avenue, New York 17.*

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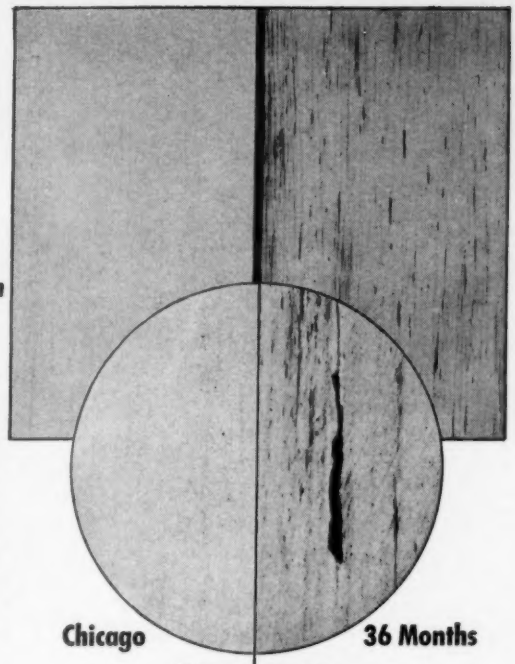
Photographs of test panels (inserts, twice actual size) show how properly lead-pigmented paints retain their elasticity, toughness, staying power . . . and appearance.



Pigmentation

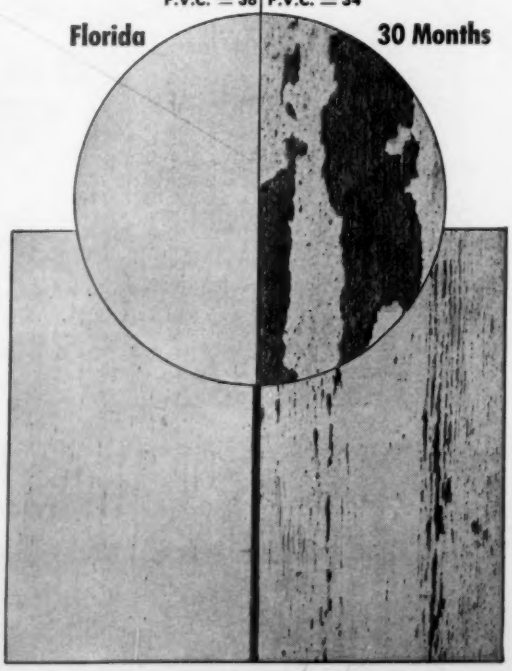
LEAD	NON-LEAD
31% White lead	36% Zinc Oxide
30% Zinc Oxide	9% Rutile TiO_2
7% Rutile TiO_2	13% Anatase TiO_2
7% Anatase TiO_2	42% Extender
25% Extender	

Self-Primed, south vertical, White Pine.

Vehicle

Both formulations contain the same bodied oil type vehicle.

P.V.C. = 36 P.V.C. = 34



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Vinyl Resin Solutions and Dispersion Coatings

By G. M. POWELL and J. F. SUTER
Research and Development Dept.
Carbide & Carbon Chemicals Co.
South Charleston, W. Va.

AS MOST persons familiar with synthetic resins are aware, there are a great many materials which can be described as "vinyl resins." For the purposes of this paper, however, the term "vinyl resins" will be limited to polyvinyl chloride and the copolymers of vinyl chloride and vinyl acetate, for these are far and away the most important commercially. Estimates as to last year's consumption of these resins run about 300 million pounds. When all of the plasticizers, pigments, and other ingredients that go into plastics compounds are counted, and the other resins normally classed as vinyls are added, the total is over half a billion pounds of materials consumed. For the entire plastics industry, the grand total for all plastics materials is given as about 1.6 billion pounds. The importance of vinyl resins is immediately obvious.

A brief review will recall the basic properties of the vinyl chloride polymers and copolymers. They are thermoplastic and can be molded and remolded under heat and pressure. They are quite resistant to acids, alkalies, oils, and water, and by themselves are colorless, tasteless, odorless, and non-toxic. In addition, they will not support combustion. Plasticization readily yields tough, flexible, wear-resistant compositions. They resist oxidation and have good electrical insulation properties. On the other hand, their thermoplasticity is sometimes a limitation; so is their tendency to split out hydrogen chloride when they are heated excessively or exposed to ultra-violet light for prolonged periods in the absence of stabilizers or protective pigments.

The consumption of vinyl resin materials mentioned above covers many familiar products: calendered film and sheeting, floor coverings, phonograph records, and many others. One of the most important fields of consumption is surface coatings; in fact, the first major use for vinyl resins was the lining for the well-known beer can. The surface coatings types can further be broken down into two classes: solutions and dispersions. These will be discussed at length in the sections which follow.

Vinyl Resin Solution Coatings

CONSIDERING first the solution coatings, these are based primarily upon copolymers of vinyl chloride and vinyl acetate. The function of the vinyl acetate is to improve the solubility of the resins, for polyvinyl chloride is relatively insoluble. For most purposes, about 12-15% vinyl acetate represents an optimum. Much more than this begins to detract from water resistance and lowers softening point too much; a decrease in amount of vinyl acetate is accompanied by increased resistance and toughness, but solubility is lowered.

Molecular weight has very much the same effect upon resin properties as does vinyl acetate. It, too, is selected to give a suitable compromise between film strength and solubility.

Figure 1 shows the various commercial grades of copolymer vinylite resins. Each grade carries a four-letter code, and the vinyl chloride contents, intrinsic viscosities, and molecular weights from osmotic pressure measurements are given. Each has different and distinct properties.

The first resin on the list, grade VYCC, is chiefly interesting because of its compatibility with nitrocellulose, and it is the only one of the group which can be so blended. It was specifically developed with this aim in mind, so that some of the properties of vinyl coatings could be introduced into conventional lacquers. It is used principally to make high quality furni-

ture lacquers, in which such properties as resistance to cold check, abrasion, alcohol, and grease are improved.

Like grade VYCC, grade VYLF is of low molecular weight, but contains more vinyl chloride. Its films are relatively weak, so it is used where good strength is not needed, e.g., in wall finishes. It is often blended with grade VYHH to increase resin solids contents in solution.

The most important of the last three resins is grade VYHH, which combines good film strength with adequate solubility. This resin will be discussed in more detail in later paragraphs. Grade VYNS is less soluble than this, but yields even stronger films. The last one, grade VYDR, is very much less soluble and is used only when unusual film strength is required, as in highly plasticized coatings for cloth.

The basis of vinyl resin solution coatings is very simple: a powdered resin is dissolved in certain active solvents, among the best of which are ketones, the solution is applied to a surface, and the solvent is allowed to evaporate, forming a film. Since the majority of such coatings can be expected to contain resin VYHH, its behavior can be examined in closer detail, with particular attention to solution characteristics.

Normally, when vinyl resins are dissolved, it is preferred to use as little active solvents as possible, for these are expensive, and to blend in non-solvents, or diluents, such as toluene, to reduce cost. It is thus necessary to know how much diluent can be added to a given solvent before viscosities are increased too much. To obtain comparative data of this type, careful studies have been made of all of the important solvents and diluents, with equilibrium viscosities measured as both solids contents and solvent-diluent ratios are varied. Figure 2 shows a typical set of data for the methyl-isobutyl ketone-toluene system. It will be seen that viscosities increase sharply in the more concentrated solutions as the proportion of ketone is reduced. These same data can be plotted in another manner, shown in Figure 3. This is called a viscosity phase diagram, for it shows the condition of the solutions in the various compositions indicated. The

SOLUTION COATINGS GRADES
VINYL CHLORIDE—VINYL ACETATE COPOLYMERS

RESIN CODE	VnCl %	INTRINSIC VISCOSITY	APPROXIMATE MOL. WEIGHT (Osmotic pressure)
VYCC	60-62	0.28	—
VYLF	86-88	0.24	10,000
VYHH	86-88	0.53	30,000
VYNS	90	0.79	40,000
VYDR	95	1.25	69,000

FIGURE 1

"thixotropic region" is the zone where the solution viscosities are especially sensitive to slight changes in composition and where they tend to show thixotropy (the property of becoming less viscous when stirred). For long term viscosity stability, compositions close to the "formulating line" should be used.

These two charts are typical of the performance of many of the commonly used solvents such as the alkyl ketones and the esters. Of course, the actual values vary with the solvent power of the individual solvents.

There is another type of behavior shown by the cyclic ketones, the nitroparaffins, and several others. This is shown in Figure 4, where the solvent-diluent system is isophorone and xylene. Here, the solution viscosities are lowered appreciably as diluent is added, but climb again as diluent is increased. Figure 5 shows these data in phase diagram form. These cyclic ketones permit higher solids solutions to be prepared without glaetion. For lower viscosity solutions, the alkyl ketones are usually preferred.

Other concentrations, beyond the scope of this paper, also enter into the selection of the solvent-diluent system to be used in any specific case.

To these resin solutions which form the basis of the coating can be added other ingredients, such as pigments, plasticizers, stabilizers, and the like as desired. The best method of incorporating pigments

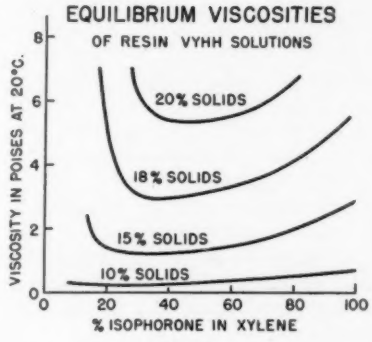


FIGURE 2

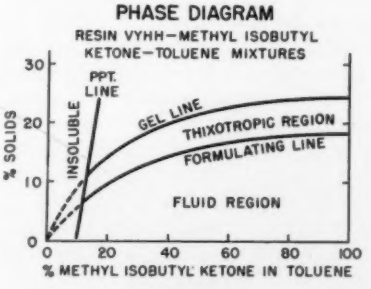


FIGURE 3

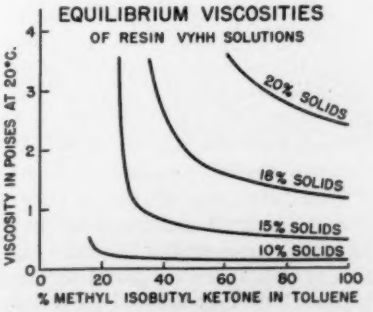


FIGURE 4

is to mill them into the dry resin on a differential two-roll (rubber) mill, then to dissolve the resulting chips to make a paste which can be blended with the resin solutions. Other dispersion methods, such as pebble-milling, dispersion on a three-roller mill, in a Banbury mixer, and the like, can also be used; specialized techniques are sometimes involved in these cases.

Spraying is the usual method of applying these vinyl resin coatings. This can be done by anyone experienced in spray technique, simply by thinning the coating to the desired viscosity by adding suitable solvent-diluent mixtures. Roller coating, casting, "doctoring," or dipping methods are also used frequently. Brushing is usually less satisfactory, because the dried film is readily redissolved by the solvents in the next coat, resulting in pick-up brush drag, but it can be used where best appearance is not important. Regardless of the method of application, it is important to note that films are formed by evaporation of solvents and diluents at room temperature. (Heat is often applied to speed drying and to remove residual thinner, but is not essential to film formation). This is in contrast to the formation of films from dispersions, as will be seen later.

Air dried films of resin VYHH will not adhere very well to smooth, impervious surfaces, a property which is utilized in many strippable coatings. Furthermore, this resin is not compatible with any adhesion-promoting materials of other types, with the exception of another Vinylite resin which will be described presently. The adhesion problem can be solved by baking the film at a temperature high enough to soften it. This in turn introduces the problem of heat stability. Over zinc and iron surfaces, this problem is especially difficult, for these metals, or their chlorides, are very active dehydrochlorination catalysts, and they cause the film to turn black during baking at the temperature needed to develop adhesion, 325°-375°F.

Stabilizers are obviously necessary. These can be of two different types. If they render the metal inert, or impose a physical barrier between the vinyl resin and the metal, they prevent the metal from catalyzing the decomposition reaction; or, if they take up the first traces of hydrogen chloride on release, they prevent the metal from having any catalytic action. Such compounds should be mildly basic, for strong bases accelerate the release of hydrogen chloride and cause the resin to discolor. As a further requirement, stabilizers should not form water-soluble chlorides, which would detract from the water resistance of the coatings. Since a complete paper could be written on stabilizers alone, it will suffice here to say that, in coatings, various lead compounds and pigments are quite satisfactory. Where lead cannot be tolerated, the epoxides, some of the milder organic bases, or the urea-formaldehyde resins can be used successfully.

Two other resins very much like grade VYHH warrant close attention. The first of these, resin VMCH, is essentially the same as grade VYHH, but is modified with maleic acid. It contains 86% vinyl chloride, 13% vinyl acetate, and 1% maleic acid, and it has an average intrinsic viscosity of 0.53. The polar carboxyl groups provide sufficient attraction for clean metal and several other types of surfaces to develop very good adhesion at room temperature — a notable advantage. Since these carboxyl groups tend to be reactive with basic pigments, causing gelation when coatings are formulated, these pigments have to be avoided. Pigments of any type are usually dispersed in resin VYHH and blended with the resin VMCH solutions. Good adhesion at relatively low baking temperatures is obtained by adding relatively small amounts of resin VMCH to resin VYHH coatings.

The second resin, grade VAGH, is derived from resin VYHH by hydrolysis of a good portion of the acetate groups, converting them to alcohol groups. Resin VAGH contains 90-91% vinyl chloride, 3-4% vinyl acetate, and 6% vinyl alcohol, with an average intrinsic viscosity of 0.57. The loss in weight during hydrolysis accounts for the higher vinyl chloride content indicated. The outstanding properties of resin VAGH are its much wider range of compatibility with other important classes of resins and varnishes used by the coatings industry, and its good adhesion to many other types of coatings. It is the only vinyl chloride type resin that adheres well to the polyvinyl butyral "wash primers"; it also exhibits good bonding to nearly every type of primer, with the exception of those based on cellulose derivatives. The hydroxyl groups also offer points for further cross-linking reactions that tend to reduce the normal thermoplasticity of the vinyl resins and to render them insoluble after application.

Uses of Solution Coatings

IT is almost axiomatic that vinyl resin coatings are used because they do a better job for the money, or because they do a job which could not be done otherwise. Consider the beer can lining: at the time this resin was selected for the job, vinyl resins were being made almost on a pilot plant scale and were relatively costly. Yet they were selected because they had no adverse effect on the taste of beer and because they prevented iron from diffusing into the beer to spoil its clarity and taste. Without the vinyl resin, beer could never have been put into the familiar flat-top cans, for no other coating available performed these functions.

There are other uses for vinyl resin solution coatings in the food and beverage packaging field. Pails for some of the soft-drink syrups are lined with vinyl resins, as are some fruit juice cans. These resins, being thermoplastic, will not withstand the high cooking temperatures needed for non-acid food cans. However, some newer formulations based upon resin VAGH and certain other reactive resins which reduce its thermoplasticity are beginning to be used in containers for foods that are cooked at high temperatures after filling.

In food packaging, much of the aluminum foil is protected by a very thin vinyl resin coating, and paper is often so coated to give it moisture vapor resistance and ready heat-sealability. A recently-developed paper milk carton has been lined with vinyl resin, because the coating permits the carton to be shipped perfectly flat to the dairy, and assembled just before it is filled, effecting very great savings in shipping costs. Clear, high gloss coatings, often heat-sealable, over

printed labels and wrappers also contain vinyl resins in many cases. The well-known paper hood cap for milk bottles, which is dropped over the bottle and heat sealed where the folds overlap, is an example.

Solutions of vinyl resins are used for applying thin, flexible coatings to cloth. Since these require very good strength even when highly plasticized, the very high molecular weight resin VYDR is used, despite its poor solubility. Clear coatings of this type are often applied to nylon, rayon, and silk. However, where considerable coating thickness is required, a coating applied by dispersion technique or by hot calendering would be used.

Vinyl resin coatings on metal are outstanding in their ability to withstand forming operations. Screw caps for bottles are shaped after the metal has been coated, and can ends are also formed after coating. The washers for "Eveready" flashlight batteries are made by coating black iron sheet with a blue vinyl resin finish, stamping out the forms, and crimping them onto the batteries.

Durability is outstanding in baked vinyl coatings. Their excellent alkali resistance and toughness has brought about their use as finishes for washing machines, kitchen cabinets, and many other types of home appliances where service is unusually rough. Some metal awnings and signs for outdoor service withstand prolonged exposure to weather better than any other type of finish. Our own laboratories record a test of a black finish exposed in the Miami, Florida area for five years with practically no loss of gloss or other failure.

Wash Primers

POLYVINYL butyral "wash primers" were mentioned earlier. These are combinations of phosphoric acid and chromate pigments in alcohol solutions of the resin. They are really more to be regarded as chemical pretreatments to inhibit corrosion than as true primers, but they give outstandingly good performance. The Research Department of Bakelite developed them as part of their very successful development project on anti-fouling coatings for the Navy. A system consisting of a thin wash primer, an anticorrosion coat based on resin VAGH, and a resin VYHH anti-fouling coat gives long service in sea water without corrosion or fouling. One ship, so coated, has been in service for five years so far without appreciable failure. This same wash primer with a resin VAGH anti-corrosion coating is widely applicable for many other types of service, with conventional resin VYHH finishes replacing the anti-fouling coating. Inland waterways locks and dams, chemical and other manufacturing plants, railroad hopper cars, and oil field equipment are just a few of the fields where this type of coating system is being used in increasing volume. The rapid drying of these coatings is particularly advantageous in dam, lock, and railroad car finishing. Air dry coatings based on resin VMCH already have been widely used in these fields.

There are many other important applications of the vinyl resin solution coatings, but one of the most interesting is strippable coatings. These are temporary coatings, to protect items during storage or shipment, and are best known for their use in the "cocooning" process for protecting surplus military equipment. When the item is to be used, the coating is simply peeled from the surface. For years, our laboratories puzzled over the problem of improving air dry adhesion, but now the defect has become an asset! This only serves to illustrate how all of the properties of a material should be kept in mind at all times.

Vinyl Resin Dispersion Coatings

ALMOST since vinyl resins were first made, it has been recognized that high viscosity in true solutions is a limitation. The use of low molecular weight resins will minimize this effect, but at the sacrifice of some film strength. When high molecular weight grades of resin, such as are required for flexible coatings for cloth, are used, viscosities are even higher, and it is necessary to drop solids contents of solutions quite low. Simultaneously, solvent costs per pound of resin applied become greater.

The development of the dispersion technique was given impetus by the desire to avoid these high solvent costs. This technique is based upon the use of a suspension of finely-divided particles of resin in a liquid which cannot dissolve them at room temperatures. Where the suspending liquid contains an appreciable proportion of volatiles, we call the suspensions "organosols," borrowing the term from col-

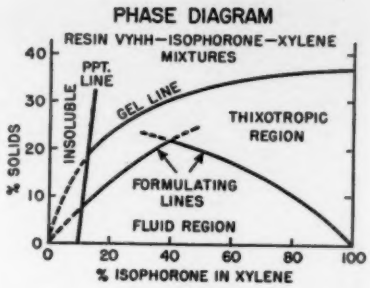


FIGURE 5

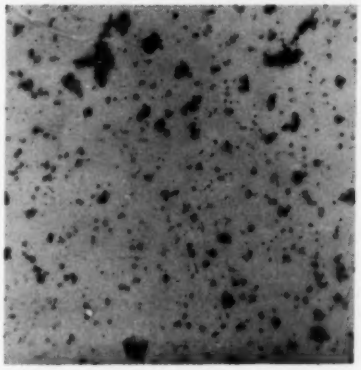


Figure 6. Electron micrograph of vinyl chloride-vinyl acetate copolymer resin dispersions.

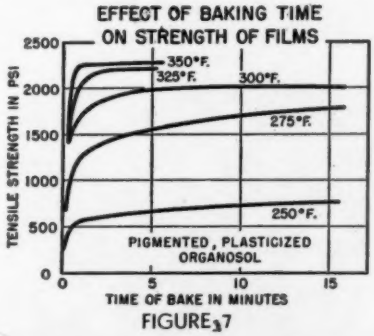


FIGURE 7

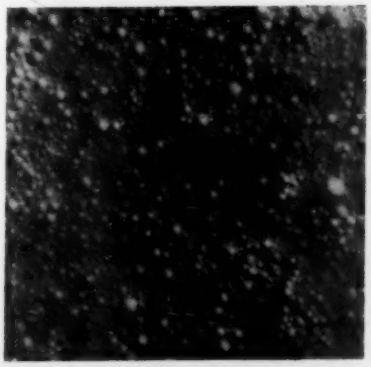


Fig. 8. Surface of partially-fused organosol.

Fig. 9. Same film as in fig. 8 after baking.

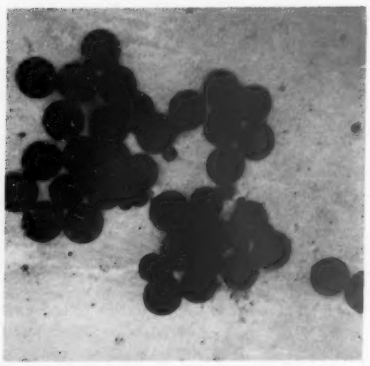


Fig. 10. Electron micrograph of NV.3 resin.

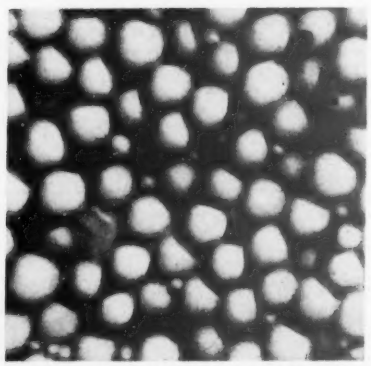


Fig. 11. Surface of partially-fused NV.3 film.

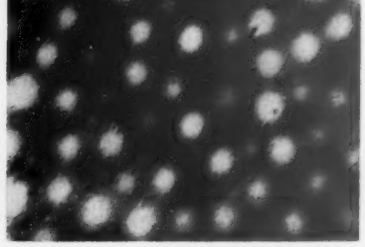


Fig. 12. Structure of NV.3 film after baking.

loid chemistry. In the special case where the liquid plasticizer has very little solvent action on the resin at ordinary temperatures, and where enough plasticizer is present to make a liquid dispersion of the resin particles, we coined the word "plastisols" to describe these pastes. If the resin is redispersed in water, we call the dispersion a "hydrosol." We prefer to use the word "latex" to mean a water dispersion of resin prepared by emulsion polymerization of the monomer's and recovered from the autoclave in this form.

Thus, in all of these dispersions there is a suspension of discrete particles of resin in a liquid. High viscosities are not encountered, for the resin particles are not dissolved at all. The difference in behavior can be likened to the comparison between a gelatin solution in water and a mud slurry (dispersion). In dispersions, resins of relatively high molecular weight are preferred, because molecular weight has no influence on viscosity. Instead, viscosity in a suspension depends upon packing effects, the volume of suspended matter in proportion to the volume of liquids, the size and shape of the suspended particles, and the viscosity of the suspending liquid. Solids contents can thus be quite high, and the cost of any volatiles used can be very low, both because of decreased amount of liquid and because there is little need for costly solvents.

An electron micrograph of the resin used in making these dispersions is shown in Figure 6. This is a high molecular weight copolymer of vinyl chloride and vinyl acetate, containing about 96% vinyl chloride. It was made by emulsion polymerization, after which the latex was coagulated to recover the resin, which was then washed and dried. The particles range in size from about 0.03 to 0.10 microns. The surface areas represented are of the order of 50-100 square meters per gram, or 5-10 acres per pound.

The process of forming a film from these dispersions is simple. After application they are heated to drive off any volatiles and to cause the tiny particles to fuse together. This is in contrast with the behavior of the resin solutions discussed earlier. In that case, heat was not needed to form a strong film; in this, it is essential.

In actual practice careful temperature control is used to give optimum physical properties. Figure 7 shows the result of a study of baking times and temperatures on the strength of films cast from a highly pigmented and plasticized organosol. Films about 3 mils thick were cast on glassine paper and baked at the various times indicated. Notice that the temperature has to reach about 325-350°F. before optimum strength is obtained, but that the time can be quite brief. The strength of a properly-fused organosol film is at least as good as the strength of a film of the same composition cast from a true solution, or molded under heat and pressure.

This film fusion can be shown also by examination of the film surfaces at various stages. Figure 8 is an electron micrograph of the surface of a partially-fused organosol film. This was prepared by the double replica technique, and the final replica was shadowed with uranium at an acute angle. The particles have been heated just enough to stick them together, but not enough to develop real strength. Figure 9 shows the same film after baking at 350°F. Notice how completely the particles have disappeared, as such.

A new grade of resin, called NV.3, is available especially for use in plastisols, and this has somewhat larger ultimate particle size. Figure 10 shows this. These spheres are 0.6-0.9 microns in diameter. Figure 11 shows a surface replica of a partially fused NV.3 film. A high temperature bake will cause almost all of this structure to flow out, as Figure 12 shows.

Formulation of Organosols

THE preparation and formulation of organosols bring up some interesting problems. To prepare an organosol, the small particle size resin described earlier (called resin VYNS.1) is used. This is charged into a ball mill along with any plasticizers desired in the final film and enough volatile ingredients to make a fluid mix. This is ground long enough to break the resin agglomerates apart and make a smooth dispersion, then the organosol is ready for use.

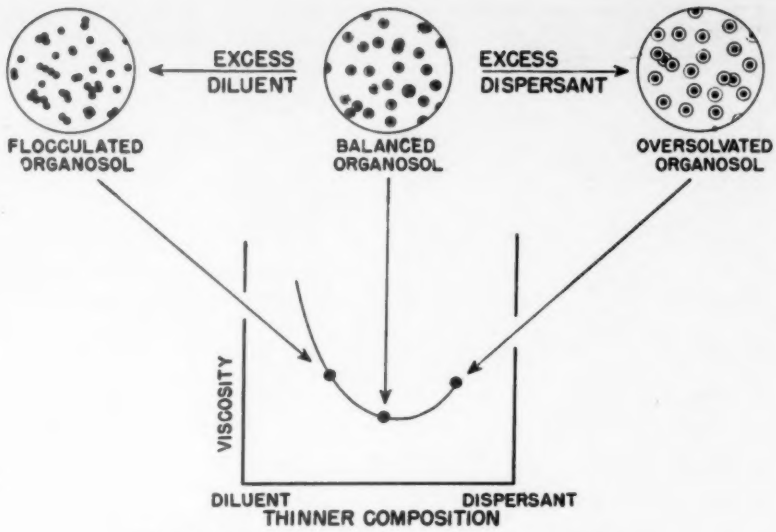
The selection of the volatile liquids has to be made with care. It

is necessary to have a certain proportion of polar liquids present to get maximum fluidity, as Figure 13 shows. Here the viscosity of the organosol is plotted against the liquid composition. The polar liquids are called dispersants, and the non-polar liquids diluents. The minimum viscosity point is characteristic of almost all systems studied. With too little dispersant, the resin particles are not completely deflocculated, so the viscosity is high. With too much dispersant, the particles are swollen too much on the surface by the dispersant, increasing particle size and hence increasing viscosity.

A great many combinations of dispersants and diluents have been studied as formulating aids. In Figure 14, the viscosity, measured in a MacMichael viscometer, is plotted against the methyl isobutyl ketone content in the liquid phase. The diluent is a blend of xylene and a naphthenic hydrocarbon. The resin content is 33% by weight. Since xylene has some swelling action on the resin, curves are shown for various ratios of xylene to naphthenic fraction. Notice how the organosol viscosity goes through a minimum in each series. The line joining these viscosity minima is called the "formulating line," for it is best to make practical compositions fall somewhere along it.

Figure 15 shows the influence of a plasticizer such as di-(2-ethylhexyl) phthalate. These organosols have 33% resin, 16.5% plasticizer, and the balance a blend of xylene and naphthenic thinner. Notice how much lower the viscosities are, and how much less of the ketone is needed. Thus, the plasticizer acts as a very good dispersant. Of course, it is not volatilized during fusing of the resin, so the amount included is determined by the properties desired in the final film.

Diisobutyl ketone is a very good volatile dispersant, as Figure 16 shows. Here, there is no plasticizer, and the diluent is xylene alone. The various curves represent different resin contents. A desirable gradual curvature is obtained, affording a wide formulating range. Figure 17 shows that with straight naphthenic diluent viscosities are very much lower, and solids contents can be raised. However, more dispersant is needed,



EFFECT OF THINNER BALANCE ON ORGANOSOLS

FIGURE 13

since this diluent has no swelling action on the resin.

These last four curves serve to illustrate the very pronounced effect of dispersant-diluent balance in organosols. These effects are reversible and are believed to have very definite physical significance. The organosols depend for their stability as dispersions upon having just the right amount of surface "solvation," or absorption of liquid upon the surface. If the molecules of dispersant have strong solvent action on the resin, they tend to strike in too deeply, especially upon ageing in the fluid state. Thus, it has just been shown that diisobutyl ketone is a better dispersant than methyl isobutyl ketone, while the latter is clearly the stronger solvent. The element of balance between non-solvent and solvent groups is strikingly reminiscent of the behavior of surface active agents.

Organosols can be pigmented quite readily. Pigments can be added directly to the mill and ground with the resin, or they can be dispersed in plasticizer and added in the form of a paste to the ground organosol. Stabilizers, lubricants, and other special additives can be incorporated readily if desired.

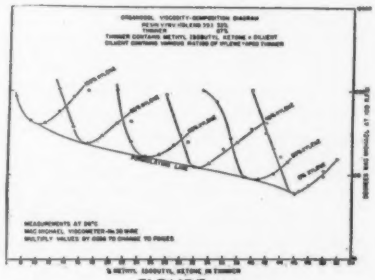


FIGURE 14

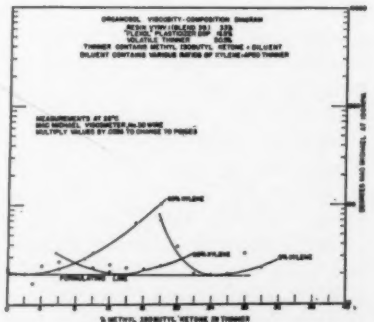
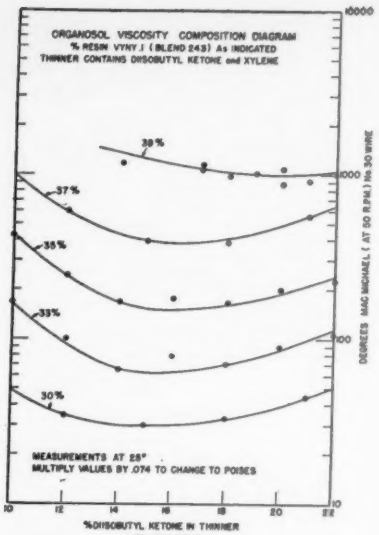


FIGURE 15

Plastisols

PLASTISOLS, as pointed out earlier, represent the spiecal case of organosols in which no volatiles are present, the plasticizer being sufficient to wet the resin particles and produce a fluid or paste-like mass. They are highly crowded suspension systems, and for this reason their formulation range is narrower and more critical than for the organosols. It is often desired to use the lowest practicable ratios of plasticizer to resin to obtain the hardest possible final compositions,


ORGANOSOL VISCOSITY COMPOSITION DIAGRAM
% RESIN VYNV.1 (BLEND 243) As INDICATED
THINNER CONTAINS DISOBUTYL KETONE and XYLENE
39%
37%
35%
33%
30%
MEASUREMENTS AT 25°
MULTIPLY VALUES BY .074 TO CHANGE TO POISES
%DIISOBUTYL KETONE IN THINNER
DEGREES MAC MICHAEL (AT 50 R.P.M.) No 30 WIRE
FIGURE 16

and this introduces complications.

Consider a collection of spheres of uniform size, such as oranges. If these are packed together very carefully to obtain minimum voids, the volume of spheres will come out 74% of the total volume of a given space. Such a closely-packed array will be rigid, just as the neatly-packed pyramids of oranges displayed in fruit stores are rigid. If the oranges are tossed haphazardly into a basket, the volume taken up by the oranges will usually come out about 60% of the total volume. On the other hand, in a careful arrangement with rows lined up on top of each other, the volume of the spheres will be 52.4% of the total.

These are the sort of packing arrangements to be considered in plastisols. The volume of voids between the resin particles must be filled with liquid plasticizer before the mass can begin to act like a fluid. If there is insufficient liquid to keep the particles well separated, the mass will not flow readily, or if it flows, it will show abnormal viscosity effects as the particles tend to get into each other's way. As a matter of fact, particles do tend to get into each other's way to some extent until their volume concentration is well under 50%.

It will be seen from the above that volume considerations govern in plastisol formulation. It is necessary to deal with the geometry of the system.

Actually, commercial resins are not perfectly uniform spheres, but they are surprisingly spherical There is even merit to blending particle size to obtain better packing. Two major types of plastisol resins are available commercially. The older of these, called resin VYNV.2, is quite similar to resin VYNV.1, discussed earlier. It is agglomerated during manufacture and must be ground with plasticizer to break the particles apart. "Marvinol" is somewhat similar. With a commonly-used plasticizer such as di(-2-ethylhexyl) phthalate, the ratio of resin to plasticizer must usually be held above 10:8 by volume (approximately), which is 47% resin by volume.

Vinylite resin NV.3, is representative of the newer types of resin developed especially for plastisols. As shown in Figure 10, this resin has a particle size in the 0.5-1.0 micron range. With this resin, the ratio of resin to plasticizer can be 10:6, or 54% resin by volume, or even higher. Also, these resins can be mixed with plasticizer without grinding, although mild milling is frequently desirable.

The primary consideration is selection of a suitable plasticizer for use in a plastisol is its behavior as a *plasticizer* for vinyl compounds. In other words, it must show compatibility, good physical properties, and all of the other attributes which are normally required in plastic composition.

In addition to these requirements, the plasticizer's contributions to the fluidity and flow properties of the plastisol must be considered. It must have a good wetting and dispersing action on the resin, yet must also have a very slight solvent action on the resin at room temperature. On the other hand, it must develop good solvent action during the fusion operation in order to yield strong final compositions. It should have low enough viscosity to render the plastisol sufficiently fluid at the resin-plasticizer ratio required in the final composition. Other things being equal, the plastisol viscosity is almost directly related to the viscosity of the pure plasticizer.

Blends of plasticizers are often useful in plastisols to obtain improved flow properties. Most of the resinous types of plasticizers are too viscous to yield fluid plastisols except at higher plasticizer ratios. They also tend to interfere with the final fusion step, so that it is usually desirable to add a less-viscous, more active solvent type of plasticizer to assist in obtaining good fusion.

Pigments, fillers, stabilizer, etc., can be incorporated easily. Usually this is done on a three-roller mill or paint mill, for this does a good job of dispersing and permits temperatures to be kept under control.

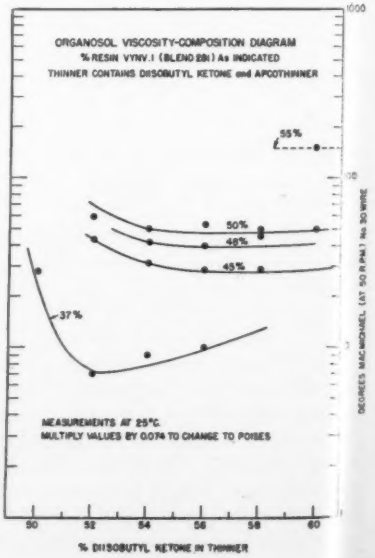
Of course, premature heating of any plastisol system tends to drive the plasticizer into the resin and raise the viscosity.

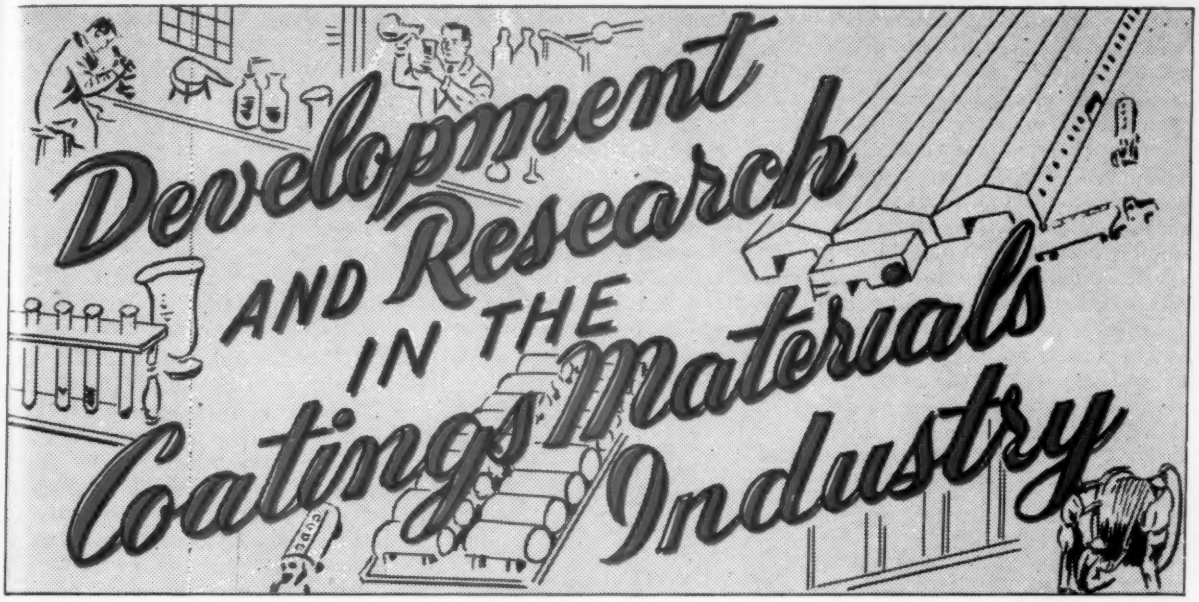
Plastisols are amazingly versatile, for they are essentially molding compositions which are liquid enough to be handled by coatings techniques. They can be handled by simple gear pumps, they can be ladled, dipped, troweled, cast, wiped, and, if thinned carefully with inexpensive thinners, sprayed or brushed. They do not require the excessive mixing and molding operations to which molding compositions are subjected. Such materials as abrasive fillers, which take their toll of most processing equipment because of the wear they cause, and phosphorescent fillers, which lose their maximum efficiency if they are excessively ground, can be incorporated easily by simple stirring. Sponging agents can be used to gain lightness of weight and insulating properties without the problem of premature sponging during compounding.

The important points to remem-

(*Turn to Page 47*)

FIGURE 17





PART VII

DEVELOPMENT TECHNICS FOR PAINT AND ENAMEL FORMULATION

By
HOWARD C. WOODRUFF
Alkyd Products Engineering
General Electric Co.

The paint formulator's job is to deliver good, inexpensive formulations — fast, and this is discussed in Part VII of this series. Such important factors as how marketing affects formulation problems, how the paint formulator approaches his problem, status of paint research, how test procedures are used, specialization, and recent trends are covered.

ACCORDING to the terminology in common use, any pigmented surface coating is referred to as a "paint". This system of a solid suspended in a liquid is not the simple system the term "paint" implies, because the word "paint" can refer to a different set of conditions according to the viewpoint from which you approach it. We have, in fact, three opposing viewpoints toward a paint.

Considering a paint before application, it exists as a liquid reaction media where both chemical and physical changes are taking place. These reactions in the storage container are relatively slow, but paint as a raw material is rarely considered stable for a prolonged storage. From the standpoint of storage, we want to have a slowly reacting material.

During the process of application to a surface, the paint becomes a material that is rapidly changing in chemical composition. These changes affect the physical condition of the material. During application, the changes occurring are quite complex — the paint reacting (a) with the material to which it is applied, (b) the paint changing in its own characteristics, and (c) the paint reacting with the oxygen of the air and losing volatile products into the air.

From a standpoint of drying and changing from a liquid to a solid, we want to have a rapidly reacting material.

After application, paint becomes a continuous solid film. It is then subject to changes in itself as well as to reaction with external forces which tend to cause disintegration.

In addition to viewing paint as a composition of matter from which we expect different properties at different times, paint can be considered from the standpoint of

Editor's Note: This discussion is based on the varied personal experiences of the author. The facts and examples cited do not necessarily represent the practices of any single company.

being an industrial raw material. At this stage, "paint" becomes a major ingredient in altering the external appearance of most industrial products manufactured today. Each major industrial product has, however, a distinctly special end use. This means that paint used on an object must be specifically suitable for the conditions under which application is carried out, and so made up as to give the necessary performance on the article where it is used. The industrial picture for paint as a raw material adds up to the observation that paint has no general application — the actual uses for paint are quite distinct from one another and very specific.

Although the requirements for the performance of a paint are in reality quite specific, the conditions under which the paint will actually be used are often not known to the formulator when he starts out to assemble a coating system. This is because a paint may move through one of many possible distribution channels in passage from manufacturer to user.

Industrial finishes represent the most direct route from producer to user, but industrial finishes account for only about 30% of paints actually sold.

The distribution of trade sales paints which accounts for over 30% of paints sold presents a picture of increased handling and therefore loss of understanding of the end use requirement by the formulator. A paint in the trade sales channel passes from producer to distributor and to a jobber before it gets to the painter who actually uses it.

Shelf goods, which account for another 30% of paint sold, pass through even more handling before reaching a user; the manufacturer sells the distributor, the distributor sells the jobber, the jobber sells the store, the store sells the user.

Under these conditions it is extremely difficult for a formulator to have more than a very general idea as to where his paints are going or what they are expected to do.

Paint Formulator in Action

BUT your paint chemist faces a practical situation. Although he does not know exactly how the products will be used, the general range of uses are rather generally agreed on, and he has to set up formulations for the products on a competitive basis meeting both price and performance standards that he can test. He does not have time to formally isolate and consider each of the many factors that have to be evaluated and overcome in the development of a formula. He has to operate within groups of material available and to get usable results as rapidly as possible without regard to theoretical considerations.

As a result of the above noncoherent set-up of conditions, your paint development man tends to approach a problem without insisting that the entire method of solving it shall be evident from the beginning. In such cases it is always possible to select one or more facts or whole series and groups of data which must be assembled before any answer is possible. When these facts have been gathered together, classified and analyzed, they suggest the need for further facts, and when the process is repeated, the direct road to a solution presents itself.

Paint Research

IN our industrial set-up as it now functions, paint development takes place prior to paint research. In many companies, paint development represents the total investigational work done with research relegated to a very minor position. Why is this? The paint industry originally consisted of a disorganized collection of individual artisans and entrepreneurs. Paint formulations and manufacturing techniques were at first secret and then the stock in trade of the paint maker. Gradually a demand grew for paint products more exactly suited for the uses to which they were applied. The new products were either formulated directly in the plant or made up in the laboratory by men having primarily a plant manufacturing background. As businesses grew, this group — originally production in background — became the development team, and later in action they became the planners and managers for the development team.

Although the paint industry and the plastics industry have similar volume production and similar growth pictures, the paint industry is distinct from other modern industries of the type represented by the plastics industry where technology is mainly derived from research. In the plastics industry, research leads and guides development but the paint industry did not originate as a result of research evolving new possibilities. This accounts for the predominance, not of research, but of development groups in today's paint industry.

The early paint research that was done was carried on intermittently as industrial time permitted — and with great reluctance to coordinate the result with prior results available, or to publish the data and conclusions. On the other hand, the paint research carried out in the various colleges was generally removed from practical applicability.

Consequently, as the results of paint research became available, they were reported in a piecemeal manner, bit-by-bit, as each individual fact was disclosed. Each single fact brought out as a result of the research work was sorted by the development group against a single basis. This basis was the question — How can this information be used to advantage in production now? This criterion meant that no new grouping of information was possible except as classified against previous data. In this environment a systematic presentation of the various theoretical foundations underlying paint technology is slow in process of integrating. Where the pressure is on to get formulations into production, it is difficult to refrain from a judgment as to the value of a fact until all facts are in.

Paint development men today, while realizing the importance of organized data background, work primarily on the approach of judging research information for its immediate utility, rather than considering a new piece of information as a building block in a structure they are, themselves, in process of building. In the next period of growth of the surface coatings industry, many people look forward to the increasing strength and practical utility of research data. They realize we need increased (a) coordination of the data we now have, (b) systematic presentation of new facts and how they fit into

ew systems, and (c) how the new acts compare to and supplement ne structure of older systems.

A Testing Problem

AT the present stages of the paint industry's breakthrough from an art into a science, ne paint formulator meets with a serious limitation when he attempts to predict how a paint will show up when it is subject to exterior exposure. Since most varieties of paints are at some time expected to withstand exterior exposure conditions, this becomes a prime consideration.

But no laboratory testing methods will rapidly foretell how long a paint will last when it is used outside. As a practical expedient, the paint formulator, in order to get his information, must make up a sample of the paint under consideration, put this on a number of test panels and expose each of the panels under as broad a set of conditions simulating the conditions of use as far as he can predict them. When his paint formulations show up a high degree of durability, he requires 2 to 4 years, and possibly longer, before his results are available. He is further limited by the fact that exposures started at different dates are not necessarily comparable or interchangeable.

Now, after two years if exposure results are available, your paint development man has some reasonable information in regard to the durability of the paint he started out with. From this point on he has to depend on the supplier of the raw materials not to make any variation in the composition or processing of the raw materials he uses to make up the paint.

Since no test on the raw materials will predict the effect of variation in raw material on the durability of the finished paint, your paint man has to resort to a further expedient and set up stringent specifications for acceptance of paint raw materials and he has to examine each batch of raw material if he expects to produce finished materials of approximately uniform characteristics.

If exposure tests require from 2 to 4 years to complete, what about new raw materials that become available? These may be cheaper, better, or easier to use, but how will they affect an established formula? Exposure again, is the only true test we have for evaluating these new raw materials. All of this means that your present-day formulator's attitude to exposure testing is this: Run comparative tests — using as nearly as possible an established standard; start tests early — as soon as raw materials appear on the market or as soon as formula changes are contemplated; make tests in as wide a range of exposure conditions as you can foresee the product will be used.

Everyone concerned, formulators, sales engineers and consumers recognize that the industry urgently needs some means of accelerated exterior exposure testing. Many suggested methods, and combinations of methods have been brought out. None have proven acceptable. This is probably due to the fact that exterior durability is a summation of so many variables, many not clearly defined or reproducible and each of uncertain degree of importance, that we have no reliable means to date of surely pointing to the important components.

Exterior durability testing is not the only testing work the paint formulator has to use for the purpose of determining comparative value of the formulations that he makes up.

Paint testing is based on the entirely practical conception that a test must predict the ability of a formulation to perform according to requirements. This means that the tests applied to a paint are rarely standard and frequently quite numerous, the paint formulator assuming the more tests he makes the sounder his information becomes. He usually has new and improved tests in process of development in an effort to devise test methods that will be referable to a product-use-basis.

His first question on considering a new test is — What does the test mean? Not necessarily in terms of components of the system, but in relation to judging how the paint will perform.

Tests may actually simulate use conditions or they may, while not actually paralleling use conditions, be interpretable to use conditions. Unlike the conventional experimentalists, the paint testing personnel rarely can (and rarely desire to) translate results to an absolute value or interpolate to a chemical-formula basis.

Most observers note that a paint laboratory changes test methods as fast as information is available that a test method is not convertible to current use conditions.

An observer also finds that different paint laboratories do not necessarily agree on the results or interpretation of the tests they employ.

Tests As Competitive Tools

DUE to the particular approach of the paint formulator in designing his paints, test procedures can be used in the paint industry to point to disadvantages in a competitive product.

When your paint man "matches" a competitive product, he rarely starts from an analysis of the competitive material. In fact he rarely has analytical facilities available.

From experience, or from a quick survey of current literature, or by talking to a salesman sent by a potential supplier, he can make something that will be in range of performance like the competitive material. Using this first formulation, he makes variations and tests, then more variations and tests until he can formulate a product that will match the *main* features of the competitive product. This is his "improved" product.

Now the competitive product has a different composition from his improved product. Numerous tests of many diverse types can be run on each product. If enough varieties of tests are made, differences naturally will appear, because the two products are not identical in chemical composition. Each of the tests can be interpreted as favorable or unfavorable, even though the test may not be related to the intended use for the product. From the range of tests made, those tests can be selected which show the competitive as less favorable in performance than the improved product and a strong case can be built-up for the improved product.

But misconception can be avoided and the situation brought back

to realistic terms when all concerned ask the questions — What does the test mean? Is the result of the test significant in relation to the use of the product?

The selection of a test is as important as the test itself.

Team Work

THE types ofoperations carried out by the Research and Development team are:

1. Evaluation of a new raw material in a paint system without modifying the system.
2. Modifying a paint system as fundamentally as necessary in order to suit a new raw material when the new material offers price or performance advantages.
3. Design of new paint systems without specific reference to existing systems.
4. Development of resource data required to make any of the above steps possible.

Of these four classifications of operations, the first two are easy to understand and amount to relatively short range matters. Using these technics, growth takes place steadily, in the same conventional type of products, in short, easily predicted, easily controlled steps.

Design work aimed at evolving new systems cannot be quickly scheduled. It is long enough in range of time that to many managements, it appears to have no direct relation to the immediate problems of a paint laboratory. It is accordingly difficult to get and maintain authorization to carry through a new system of design work.

But new-system-design work has recently gained momentum and industrial importance. As a result of new conceptions in new system design we see:

The rapid growth of paints based on elastomer latices (emulsion paints),

The new vinyl coating systems where adhesion is assured by means of the "wash-primer",

Anticorrosion systems based on chromates of controlled solubility,

Highly chemical resistant systems based on polymers of chemically modified phenol.

New Approaches to Paint Research

1. *Consideration of a Paint Film as an Engineering System*
   - (a) Leads to practical results by guiding formulation on a precision basis.
   - (b) Subjects paint films to physical test evaluation, results subject to mathematical treatment

2. *Setting together new paint systems*
   - (a) Leads to new paints having properties in application and performance not previously available.
   - (b) Operates by taking new data and synthesizing a system without reference to established systems.

The products originating from the successful design of a new system tend to have wide market appeal and to show a rapid growth picture. But before a new system passes from the starting stage to the marketing stage, great masses of resource data, experimental and otherwise, must be collected, sorted, coordinated and utilized. Often the amount of time, effort, and expense actually required is not visibly connected with the resultant product.

In contrast, the testing of a new raw material in an established system seems to require less resource data. But it is probable that the ammount of resource data required is in the same order of magnitude for both technics of operating. We have at our disposal, however, masses of unrecorded reference data commonly available to all so that we are not aware of its existence and scope.

Specialization

PAINTS competitive to those now marketed, competitive in performance and price, are the result of extensive development, testing, and reformulation. This work is based on and contributes to a mass of reference data. Data in relation to one type of paint is not as a whole transferable to another basically different paint problem. The background of information becomes most pertinent to the end-use for which the paint is supplied. This results in a natural specialization within the field of paint formulation directed to specific types. Thus, information and data in connection with primers for aluminum castings is not readily applicable to housepaint formulations.

Methods of working, technics, on the contrary, easily adapt themselves from one phase of paint development to another.

New Paint Systems

ACCORDING to current published reports a number of fundamentally new paint systems are now subject to detailed investigation. Among these are (a) system based on isocyanate derivatives aimed at producing primers of superior adhesion, (b) system based on silicone polymers aimed at special anticorrosive properties (c) systems based on polyamid derivatives aimed at producing films of superior toughness and distensibility, (d) paints based on alkyd-copolymer systems for increased speed of drying coupled with excellent durability. Coating systems derived from titanium resins and systems derived from allylpolysaccharides are reported to be reaching the marketing stage. It appears, from the number of marketing studies now being conducted, that numerous as yet unnamed systems are being actively investigated.

New Approach in Research

WHEN you consider a paint film as an engineering material a new series of possibilities becomes apparent. The

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Today's Importance of Effective Marketing

By FRED I. SMITH
Stewart, Dougall & Associates, Inc.

THE ten short years since 1942 have witnessed such startling developments as the home permanent for the further beautification of our womenfolk; the wonder drugs like aureomycin and ACTH for the extension of our life span; television and the long-playing record for our greater pleasure; and now the scientists are talking about man-made satellites and inter-planetary travel.

The past decade has seen another development that hasn't made the headlines but that—in sheer importance to those of us in business or industry—is probably more significant than those we've mentioned. This phenomenon is the transference of economic power from industry to government. This is certainly the essence of the political changes that have occurred in this country—in all countries for that matter.

The result is that, today, industry is increasingly an extension of government, rather than government an extension of industry. Today, every important business decision takes the government into thoughtful consideration. Business enterprises now face taxes that would have been laughed at as fantastic a decade ago. Nor is a high tax level temporary.

There is a tenacious and rugged quality unique to American industry. It is eternally hopeful, eternally persistent. Last year federal taxes on corporate earnings totaled $27,000,000,000. But industry appropriated $25,000,000,000 for new plants and facilities. Some of this—a minor proportion—was born of armament contracts, — but even these additions to our production facilities will, it is expected, ultimately revert to the manufacture of industrial and consumer goods.

Effect of Taxes

THE classical economist has for years preached that high taxes are a deterrent to business activity, — especially to the expansion of production through the investment of corporate earnings. This academic viewpoint ignores the rugged persistence of American business men. I'm inclined to believe that high taxes have stimulated rather than retarded business expansion.

If we can assume that the manager of a business wants at least to maintain his company's earning position — that is, to produce, in spite of taxes, an increasing number of dollars for his stockholders (and who doesn't?) — then there are two courses open to him.

First, he may expand his gross to increase his net — do more business either in his regular products or by adding new products, or both. Second, he may run his business more and more efficiently — squeeze out more and more of the waste — so that a larger *net* will result from the *same* gross. In both cases, the end is to satisfy the tax collector and still take care of the stockholder.

Each of these courses are being adopted by business and industrial enterprises. The result of expanded production capacities coupled with drives for larger volumes of business and markets for new products must ultimately be a scramble for sales volumes. Many industries are today scratching gravel for business and — barring an all-out war or some other artificial shot in the arm — the scratching will get tougher.

Marketing

BUSINESS costs fall into three broad categories, — the cost to *make* (materials, labor, supplies, etc.); the cost to *be* (amortization, taxes, management); and the cost to *sell* (payments to *those* who sell, advertising, promotion, credit investigation, delivery).

Broadly speaking, all producers of the same product of a like quality pay about the same for materials and their utilization. The cost of manufacture, we find, varies, at best, only a few percentage points. The same can be said, in the broad sense, of overhead expenses. The point is that these cost elements are more or less dictated — there isn't very much the business manager can do about them — or, if he does find a way to reduce these kinds of costs, he soon finds that his competitors have done the same.

The cost to sell is, however, subject — or, at least, *more* subject — to pronounced improvements. A betterment of 10 percent is not usually too difficult to accomplish and, sometimes, substantially greater improvements can be made.

To accomplish this, the formula is relatively simple. It involves the development of a marketing program in which all the elements are properly related to each other. Avoiding detail, these elements include:

1. The market — where it it? Who is it? How big is it? How is it changing? Why?

It's surprising how often companies concentrate sales efforts in the smaller — perhaps older — segments of their markets and fail to attack or attack half-heartedly the newer and often the more promising segments. Markets, like people, are constantly changing. But, just as we see no change in the people we are with every day, some businesses do not detect the changes that occur in their markets. This may be difficult to

Presented before Vehicle Manufacturer's Group of the New York Paint, Varnish & Lacquer Assn. on April 23, 1952.

understand, but let me assure you, in our work we see it time after time.

2. The product — how well, against competition, does it satisfy the wants and needs of the user? Is it properly packaged? — for shelf or display value, for clarity of instructions, for ease of opening? Is it priced right? Is it available in sizes and quantities users want?

   How well do users — and potential users — know it? What's its reputation?

Those of us who are working with market problems day in, day out and who see a variety of actual sales programs in operation, are surprised at the wide difference between the viewpoint of the manufacturer of a product and the user — or potential user. Perhaps it's a form of self-hypnosis, but in company after company the executives will talk in superlatives about their product — it is unquestionably the best, the longest lasting, most economic, finest performing, best tasting, superior looking, most serviceable in the market. Generally — but with some exceptions — clients tell us, in effect, "Don't worry about the product. We *know* it's the best. Our problem is how to sell it." How often the users — or potential users — disagree!

The third — and vitally important element — the marketing effort. Is the sales force effective? Are the men adequate for the sales job? Are they properly trained? Do they know the product and its uses? Do they know how to sell it? Are they well directed? Supervised? Kept alert? Are they paid under a plan that provides a forceful incentive? Are they supported by effective sales promotion?

The jobbers, manufacturer's agents, distributors, retailers — do they *cover* the market? Are they the *right* channels? Are they interested in doing a job or do they handle the product chiefly as an accommodation?

Is the discount and mark-up structure sound? Are the efforts to assist the distributor appreciated? Used?

Is the advertising effective? Is it reaching the right people? Is it geared to the whole sales plan? Is it too little? Too much?

These are some — not necessarily all — of the questions that arise in the work of streamlining sales operations. They are easy to ask; frequently hard to answer. But, in their answer lies better, more economic, less costly marketing.

Take, for example, a product that costs one dollar to make and, let's say, a dollar and a half to sell — and forgetting for the moment the cost of taxes and overhead. Let's assume a volume of $2,000,000 a year — this being the cost to make (labor, materials, and direct burden), the cost to sell, and a net before taxes of 15 per cent, — (or $300,000).

A 10 percent lower cost to sell would result in increased net before taxes of some $102,000 annually. The 10 per cent lower cost to sell would, in this instance, increase the net before taxes by some 34 per cent. Split this added income of $102,000 with the tax collector, and you're still well ahead of the game.

Reducing Sales Costs

IN this instance, we confined ourselves to the effect of reducing sales costs.

More frequently, it is better practice to approach the problem by seeking ways of improving the efficacy of the sales function, — of getting more business for approximately the same cost, rather than merely cutting down sales expense. The two, of course, are interwoven.

It is in these fields that our organization serves. We haven't as yet perfected a crystal ball that tells us the answers to four decimal places. But we have developed a way of getting results, and that is by discussions with the people involved, — buyers, potential buyers, people who used to buy but now patronize somebody else, distributors, jobbers, retailers, salesmen — whoever may be part of the picture. And it works!

Perhaps the best way to illustrate the application of market research in the industrial field is to mention a specific job, — one that is more or less typical.

Picking one out of more than 1700 completed assignments is not too easy, especially when it is remembered that the results of work done for clients is usually confidential. In this case, however, we are permitted to disclose how the problem was attacked and what results were achieved.

The company's sales, when they first came to us, were $7,720,000 and their net earnings before taxes for the same year amounted to $565,000. They manufacture and distribute a line of equipment and supplemental supplies, with the majority of their business in the commercial and industrial fields. At that time, they held a position of about 23 per cent of their industry.

Our job was to appraise the sales operation, to evaluate the market — which industries and which institutions (hospitals, state, county, city governments, insurance companies) provided the best potential; to learn how these buyers could best be sold; and to determine the effectiveness of competition.

We found, in the credit side of the ledger:

1. A high degree of acceptance of the company's machines and supplies.
2. A splendid reputation for reliability and business character.

On the other side:

1. Inadequate sales coverage — some few territories or areas were getting more coverage than required; most were getting far too little.
2. Ineffective salesmen — men were poorly trained and not properly surpervised and directed.
3. Small accounts received a disproportionate amount of time and attention.

   It was found that the company lost money on customers who bought less than $1000 in supplies per year, simply because the selling cost exceeded the gross profit.

   For example, it was found that unless a bank had $50,000,000 in deposits, a hospital had 500 beds, or a city had 55,000 people, they — with perhaps a few exceptions — don't use $1000 worth of the product per year. There are 428 such banks, 333 such hospitals, and 199 such cities.

The distribution system was revised by the development of a wholesaler organization. The larger users were held as "house account" and sold direct, but the balance of the accounts — some 15 to 20,000, were used to attract and stimulate wholesalers.

A sales training course was installed for the salesmen who then spent much of their time with the wholesalers. An incentive plan for salesmen was put into effect. Controls were installed. The sales administrative people — who previously had a number of duties unrelated to marketing — were given the responsibility and authority to build profitable sales volumes.

It took three years to develop and install the new marketing system. But it works.

Last year, the company's sales totaled almost $13,000,000 and their net before taxes was slightly over $1,000,000. Granted that the last three years have been good for most business, — still the company now enjoys a position of almost 40 per cent of the industry and their earnings have increased almost exactly 100 per cent. The Chairman of the Board of the client company is kind enough to credit the betterment to the improved marketing.

In closing, the marketing function of a company is the area most open to betterment, the end of the business where ingenuity can best be converted into added revenue, the place where a company's personality can be capitalized, and the arena in which, now or later, the company must win its competitive place.

Some Notes on Corrosion

By H. L. RICE

What is corrosion? The subject is certainly not new. In fact this problem has proved to be very troublesome ever since the Industial Revolution when metallic products of all types came into wide use by man. To the engineer, this problem has assumed considerable proportion as compared to other problems that he frequently is called upon to solve. This fact becomes more and more apparent when it is to be considered that our gigantic industrial economy requires the use of all types of metals in the construction and maintenance of power plants, oil refineries, sewage and water treatment plants, and chemical plants of every description.

Therefore, it behooves the engineer to understand how corrosion in many of its manifestations does occur from many causes, and to effect such remedial action as to eliminate the cause to control corrosion. Perhaps it would be best to define corrosion as the detrimental action of eating or wearing away by degrees, as for instance, the action of acids and alkalies on metals, or the action of oxygen, moisture on metals which changes it into the oxides of the respective metals. This definition would not be complete unless it included the state of corrosion to metals by galvanic (two metal cell) concentration or solution cell, dizincification, corrosive cracking and fatigue.

Causes of Corrosion

Corrosion may be caused by an electrostatic attraction between opposite charged ions, namely, a form of polar bngage. The degree of attraction resulting between these opposite charged ions will also eventually determine the degree, intensity and direction of the subsequent corrosion taking place. To explain further were we to classify these polar groups as follows:

1. Polar groups of high mutual attraction or large unsatisfied fields of force.
2. Polar groups already neutralized within the field of force. In each case, the properties of the polar groups present, the degree on which these properties manifest themselves depends on how powerful the force of attraction is within the field of force, or to what extent the polar groups within the field of force have become neutralized.

The final degree of corrosion that may be caused will depend a great deal on the degree of unit of intensity within a given field of force, or polarizability, which is also the degree of deformability of the original material itself. To give specific examples or illustrations how this theory of corrosion may be applied in a practical manner, the following cases in which this theory applies are cited:

1. It is very well known that when aluminum metal oxidizes in the air, it will form a film of aluminum oxide on the surface which protects the rest of the aluminum from further being attacked by the oxygen of the air. The resulting aluminum oxide became completely neutralized to a degree which reduced the intensity of further polarization.
2. It is also very well known that dilute acids are more corrosive than concentrated acids. This is due to the presence of polar groups in the concentrated acids, which are of equal magnitude with the polar groups of the materials they would tend more or less to corrode, as compared to polar groups in dilute acids, which are of lesser magnitude.

In other words, corrosion may be termed polarization, which may be any change produced by the electrostatic attraction between opposite charged ions to cause a change in its energy level to differ from its reversible or normal value, namely, a deformation of the electric fields of force of adjacent positively charged ions of polar groups.

Effect of Moisture

Were we to look more closely into this problem, we would find that moisture and the elements of oxygen and hydrogen are the actual causes of corrosion. Oxygen is definitely a very active agent in the corrosion of metals of all types with the exception of platinum and gold. Apart from both water and air being necessary for any form of rusting or oxidation to take place, there are other elements which accelerate this process. The most important and destructive corrosives are: air, soil, acids, alkalies, natural waters, chemical salt, brine, heat, sulfur and sulfur bearing compounds.

Corrosion or rusting does not occur unless a certain percentage of moisture is present in the air. Steel or iron will not rust in perfectly dry air. It will not rust when completely immersed in water from which all its air has been completely removed. It would be a matter of of interest to indicate that air is capable of dissolving in water to a small extent; consequently, water always contains a certain percentage of air.

Too often insulating materials such as asbestos cement, (85% magnesia) pipe coverings have been needlessly blamed as causing corrosive effects to steel and aluminum. This theory in itself is completely erroneous. It is very well known that portions of the cement and magnesia are soluble in water and are alkaline. However, had these same insulating materials been processed with a thorough waterproof, weatherproof material, there would be no chance of corrosion to occur. It is needless to state that with the proper type of waterproof coating or jacket, regardless where and to what degree of exposure, the insulating materials would remain dry, to the extent they would and could not absorb moisture from the air to cause rusting or corrosion.

Electrolytic Theory

Another point that must be considered on the subject of corrosion is the general accepted theory of electrolytic dissociation. This demonstrates that moisture on the surface of the metal acts as an electrolyte and undergoes a process of ionization. The existence of an electric current stimulates the natural tendency of the metal to go into solution at the anode, which is the positive point, and to form an oxide or corrosion at the cathodic (negative points along the surface.) This electrolytic theory ac-

(*Turn to Page 52*)

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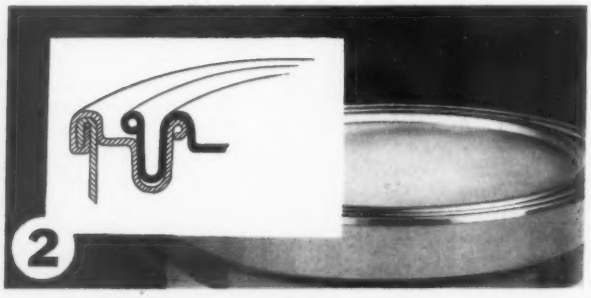

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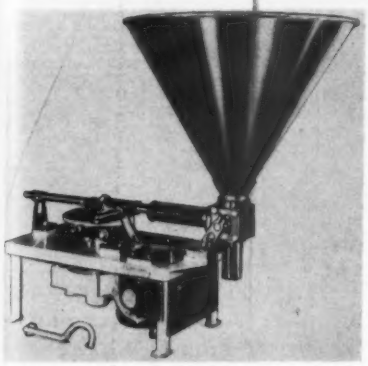

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Antiseptic Type

Containing Hexachlorophene (U. S. Patent No. 2535077) these creams provide a "zone of inhibitation" against Staphylococcus aureus and are so formulated as to be almost neutral in pH, thus assuring against irritations from free acids or alkalis.

The new creams, packed in attractive 12 oz. tubes for easy, sanitary handling are: #211, an oil resistant, water soluble bland vanishing cream for protection against dust-borne irritants, viscous oils, dirts, greases and grimes; #311, a water-resistant soft cold cream for protection against dilute acids and alkalis; and #411, a solvent-resistant water soluble bland vanishing cream for protection against organic solvents, acetates and cooling and cutting oils of low water content. West Disinfecting Co., 42-16 West St., Long Island City 1, N. Y.

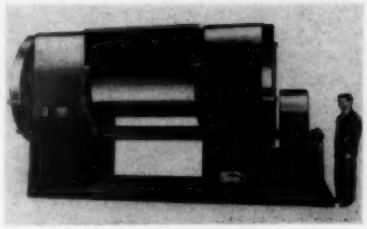
OVERSEAL
For Sealing Paint Cans

The "Overseal" was developed in response to a need created by the U. S. Post Office ruling of 1949. The ruling made it mandatory for shippers to solder covers of paint cans in several places. When this proved to be both an expensive and cumbersome operation, engineers designed the "Overseal", which has been approved by the U. S. Post Office for all paint can shipments through the mail.

In addition to eliminating the need for soldering, the "Overseal" is attractive in appearance and performs efficiently by exerting an even pressure on all points of the can cover. A breakaway tearstrip for easy removal is a feature of the "Overseal", and the seal itself may be applied to the can with a simple closing machine.

"Tripletite" paint cans are now constructed with the special seam needed to anchor and hold these seals. Continental Can Co., 100 E. 42nd St., New York 17, N. Y.

CONTINENTAL



PAUL O. ABBE

PASTE MIXER
For Large Batches

Mass and paste mixer is specially designed for large batches of caulking compounds, according to the manufacturer.

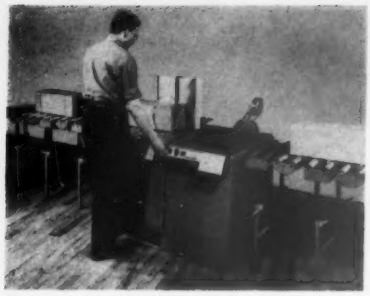
It has a capacity of 360 gallons. It stands 90 inches high and is driven by a 40 H.P. motor.

By contrast, the small mixer of the same type has a capacity of 4 gallons, stands 17 inches high, and is driven by a motor of 1/3 H.P. to ½ H. P., according to the stiffness of the materials being mixed.

Both mixers are manufactured by Paul O. Abbe, Inc., of Little Falls, New Jersey.

POLYESTER PLASTICIZER
Wide Range of Compatibility

Polyester resin plasticizer, "Bonner L-894", is recommended in nitrocellulose coatings, and according to the manufacturer, films plasticized with L-894 exhibit high gloss, high flexibility, and high tensile strength. It is also stated that this plasticizer has a wide range of solubility and compatibility: soluble in alcohols and hydrocarbons (aromatic and aliphatic); compatibilities include cellulose esters and ethers, chlorinated hydrocarbons, and some of the vinyl copolymers. Uses include aircraft finishes, water-proofing and flame-proofing coatings and industrial lacquers. Bonner Chemicals, Inc., 31 Spruce St., Leominster, Mass.



ACME

STRAPPING MACHINE
Accomodates Various Sizes

This machine, designed to speed high-volume flat steel strapping operations and reduce operator fatigue, produces strap joints by spot welding. Machine can accomodate many different package sizes, and there is no limit to the amount of strap that can be fed or the amount of slack that can be taken up.

In operation, packages approach the machine on a roller conveyor from the right. After strapping, they leave the machine from the left. Roller sections in the table top of the strapping machine facilitate location of packages over the tensioning and welding unit, eliminating the necessity for manual lifting. Fourteen ball-transfer rollers, built into the table top around the strapping mechanism, further eliminate handling operations by permitting packages to pass over this mechanism or to be turned for cross strapping with a minimum of effort.

When a package is centered over the strapping mechanism, the operator simultaneously feeds out the required length of strap by deflecting the strap-feed pedal with his foot while guiding the strap around the package and into the V-shaped guide slot in the table top with his right hand. His left hand is used to hold the package in place against the back guide. The guide slot in the table top automatically centers and locates the entering strap.

When the strap is around the package, the operator actuates the cycle bar under the control panel with his right hand. This causes the strap to be tightened around the package to a predetermined tension, cut from the coil, and then joined by welding. Acme Steel Co., Chicago, Ill.

ADDITIVE
Retards Pigment Settling

In experimental work on the solvent dispersions of styrene-butadiene paints, it is reported that Raybo 6 shows a great influence on retardation of settling of pigments. This is particularly true where solvent proportion is relatively high. Samples of Raybo 6 and further data can be obtained from Raybo Chemical Co., 1120 Chester Ave., Cleveland 14, Ohio.

CMC, CMC-CT UNITS
Has More Active Ingredients

Crude CMC, CMC-CT, will be packaged in a new larger bag which will contain a guaranteed minimum of 50 pounds dry active sodium carboxymethylcellulose, according to the manufacturer.

In addition to the new convenient weight basis, the active ingredient content of CMC-CT has also been increased in order to facilitate handling and storage. The new material will have an assay of about 80 per cent CMC; therefore each bag will have a total dry solids weight of about 62½ pounds.

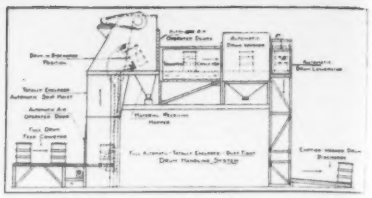
The increase in active CMC reduces residual salts which serve no useful functions in most applications for CMC. Hercules Powder Co., Wilmington, Del.

PLIOLITE S-5B
Lower in Price

Pliolite S-5B is comparable to quality to Pliolite S-5 milled resin, yet lower in price according to the manufacturer. Pliolite S-B is a copolymer of styrene and butadiene, and is reported to be superior in quality to the milled resin in three respects:

Solutions of the new resin are improved in color, being water-white; the material is an improved deflocculating or pigment-dispersion agent; and it has faster solvation properties.

Formulations and manufacturing techniques based originally on the milled resin can be used to produce concrete floor paints and finishes, aluminum paints, wall sealers, metal primers, and deep tone exterior stucco finishes. Goodyear Tire & Rubber Co., Chemical Div., Akron, Ohio.



GIFFORD-WOOD

DRUM CONVEYOR
Automatic

Fully-automatic conveyor system empties up to 40 drums per hour. The totally-enclosed drum-emptying system eliminates manual lifting, cuts work-hours, provides dust-free emptying and washes emptied drums. Three chemical plants are now using this equipment and other processing plants may easily adapt it to their operations—plants in the rubber, petroleum, paint, plastics, and other industries.

The system comprises four principal units (see line drawing): (1) a totally enclosed automatic skip hoist, (2) a transfer conveyor, (3) an automatic drum washer, and (4) a lowerator.

In operation, a roller conveyor brings drums to the skip-hoist enclosure, an air operated door automatically opens, and a drum is pushed in and onto an elevating carriage by an air operated pusher. As the door closes, clamps on the carriage grasp the drum (either 30 or 50 gallon size) and the hoist elevates and up-ends the drum, emptying its contents through a grating into a receiving hopper. The drum is then released from the clamps and drops onto the grating which is electrically vibrated to dislodge any material still in the drum.

The air operated exit door opens, a ram pushes the drum onto the transfer conveyor, the exit door closes, the empty skip-hoist carriage returns to the loading position, and the entrance door opens again to receive the next drum.

The transfer conveyor then moves the drum into the automatic washer where it is cleaned both inside and out, washed, rinsed and blown dry. Automatic doors seal the washer chamber during cleaning. From the washer the drum travels to the automatic lowerator and is fed to the discharge conveyor.

Gifford-Wood Co., Hudson, N. Y.

DEODORANTS
For Latex Emulsion Paints

Series of deodorants, called Paintodors, are aimed at solving residual odors of such latices as polystyrene, polyvinyl acetate, styrene-butadiene copolymers and other resin bases used in these new paints. It is reported that no additional processing is necessary for these deodorants and that they can easily be incorporated, in small concentrations, directly into the synthetic finish. Concentrations range from as little as 1/40 to 1/10 of 1 percent based on the weight of the solid content of the paint. For further details, write to the Sindar Corp., 330 W. 42nd St., New York 36, N. Y.

NOW AVAILABLE FOR YOUR CONVENIENCE:

TITANOX-C-50

...containing 50% rutile titanium dioxide, 50% calcium sulphate extender

To meet the increasing need for a pigment having intermediate hiding power — between TITANOX-RA and TITANOX-RCHT — TITANOX-C-50 is now available.

This new pigment should be especially useful in the semi-gloss range and in certain flats where it is desired to lower pigment volume but maintain hiding. It should be an efficient and convenient replacement for various blends of rutile titanium dioxide and rutile-calcium pigment as well as rutile titanium dioxide and extender.

TITANOX-C-50 will save you time and trouble in mixing pigments and may also simplify your inventory.

Like all Titanox composite pigments, TITANOX-C-50 is a true composite—superior to ordinary blends of rutile titanium dioxide and ordinary extenders. It is *coalesced* — pigment and extender are durably bound together in a uniform structure.

For further information on TITANOX-C-50 write to our Technical Service Department, Titanium Pigment Corporation, 111 Broadway, New York 6, N. Y.; Boston 6; Chicago 3; Cleveland 15; Los Angeles 22; Philadelphia 3; Pittsburgh 12; Portland 9, Ore.; San Francisco 7. In Canada: Canadian Titanium Pigments Limited, Montreal 2; Toronto 1.

® TITANOX
the brightest name in pigments

TITANIUM PIGMENT CORPORATION
Subsidiary of NATIONAL LEAD COMPANY

1952

M. J. Fortier

M. J. Fortier, Vice President of Sherwin-Williams, Dies at 48

Michel J. Fortier, vice president and general manager of the Sherwin-Williams Company, collapsed and died May 31. Mr. Fortier was 48.

In 1928 he joined the John Lucas Company at Philadelphia, a Sherwin-Williams subsidary. Three years later he was made a sales representative of the parent firm in New Orleans. In 1935 he took over the duties of division manager for the company in New Orleans, and in 1940 became district manager of Sherwin-Williams Mississippi Valley district.

By 1943 Mr. Fortier had advanced to district manager of the North Central District for the concern. A year later he was named vice president and general manager of the Acme White Lead and Color Works in Detroit, another Sherwin-Williams subsidiary.

Returning to Cleveland, in 1944, he was elected a vice president and became executive assistant to the president. In the same year he was named to the Board of Directors. In 1945 he was named to the administrative post of vice president and general manager, the position he held at the time of his death.

Among the directorships Mr. Fortier held were: Affiliated Gas Equipment, Inc., Cleveland; Acme White Lead and Color Works, Detroit; John Lucas Co., Philadelphia; Rogers Paint Products, Inc., Detroit; Martin-Senour Co., Chicago; Hemingway and Co., New York; Texarkana Paint Co., Texarkana, Texas; The Lowe Brothers Co., Dayton; and the Sherwin-Williams Co. of Cuba.

•

American Cyanamid Company Awards 17 Fellowships

The American Cyanamid Company's program of grants and fellowships t universities this year included seventee graduate fellowship awards in chemistr and chemical engineering. The fellow ships were awarded to graduate student in their final pre-doctoral year of stud and carry a stipend of $1,500 plus fu tuition and incidental laboratory fee They also include $300 for unrestricte use by the department of chemistry chemical engineering of the student University.

Universities where students have bee awarded fellowships by Cyanamid f the 1952-53 academic year are:

Carnegie Institute of Technolog Columbia University, Duke Universit Iowa State College, Massachuset Institute of Technology, Princeto University, Purdue University, Stanford University, Ohio State University, Pennsylvania State College, Tulane University, and the Universities of Colorado, Illinois, Michigan, Minnesota, Washington, and Wisconsin.

Cyanamids program of grants and fellowships also includes financial aid for certain agricultural and medical research projects.

•

H.F. Kleinfeldt, Vice President of Abbe Engineering, Dies

Henry F. Kleinfeldt, vice president of the Abbe Engineering Company, manufacturers of mixing and grinding equipment, died on June 6.

Mullaly Laboratory Dedicated At Newark College of Engineering

On May 21st, the Arthur L. Mullaly Laboratory was officially opened and dedicated at the Newark College of Engineering. The laboratory, sponsored by the Mullaly family in memory of the late Arthur L. Mullaly, President and Founder of the Advance Solvents & Chemical Corporation, is for use of undergraduate and technical students, and for sponsored independent paint research through fellowships.

At the dedication, the Mullaly family was represented by Mrs. Mary Mullaly and Mr. Arthur B. Mullaly, widow and son of the late Arthur L. Mullaly. Also present were: Mr. Robert W. Van Houten, President of Newark College of Engineering; Mr. William Hazell, Dean of Newark College of Engineering; Dr. M. Lelyn, Head of the Chemistry Department; Professor F. W. Bauder, Instructor; Professor Clarence H. Stephans, Director of Industrial Relations; Mr. Irwin G. Morris, Industrial Public Relation; Mr. Cornelius Cotter, Director of Advance Solvents & Chemical Corporation; Mr. J. S. Young, Assistant to the President of Advance Solvents & Chemical Corporation; Mr. Milford H. Corbin, President of New York Paint Varnish & Lacquer Association; Mr. Harold Shakespeare, Chairman of the Educational Committee of New York Paint Varnish & Lacquer Association; and Mr. Fred Damitz, Chairman of the Educational Committee of New York Paint & Varnish Production Club.

L. to R.: Harold Shakespeare and C. Stephans.

A. Mullaly, M. Mullaly, R. Van Houten.

Wm. Hazell, Cornelius Cotter, Prof. F .Bauder.

C. G. Goebel

J. D. Fitzpatrick

Emery Establishes Fellowship At University of Cincinnati

Emery Industries, Inc., of Cincinnati, Ohio, has established a fellowship for study of the chemistry of fats and oils at the School of Applied Science of the University of Cincinnati. J.D. Fitzpatrick, who joined Emery in 1935 immediately after receiving his degree in chemical engineering from the University of Cincinnati, will be the first fellow under this grant.

Mr. Fitzpatrick has been the manager of Emery's chemical research division since its inception in 1943. Dr. Charles G. Goebel, who has been associated with Emery since 1943, will succeed Mr. Fitzpatrick as head of this department. Dr. Goebel obtained his A.B. degree in chemistry from the University of Indiana and his Ph.D., with an organic chemistry major, from Purdue.

Dr. Goebel's work has resulted in a new plant to manufacture a dimerized fatty acid, dilineolic acid. Marketed as Emery 955 Dimer acid, it has found use in the adhesives and surface coatings fields. Mr. Fitzpatrick developed the first practical method for the chromic acid oxidation of oleic acid to produce azelaic and pelargonic acids. Their most recent activity concerned the development of an ozone oxidation process for producing azelaic and pelargonic acids from oleic acid. Construction of a new two million dollar plant for this process is in progress.

•

Stanford Research Institute Report Lists Paint Project

The 1951 annual report of the Stanford Research Institute listed 215 research investigations. 128 projects were commercially sponsored, and 26 were sponsored by federal or military agencies. Among the investigations was a study of efflorescence on latex-base paint films, sponsored by W.P. Fuller Company.

Second ADM Fish Derby

The second annual ADM Fishing Derby was announced recently by R. S. Mathews, director of fish oil sales.

According to Mathews, top fishermen in the paint industry will divide up $1,150.00 in Defense Bonds, plus three grand prizes. This year's contest also includes three new classes of fish — the Albacore, the Gar and the Alligator Gar.

This means that almost any game fish you're likely to catch in North America is eligible for entry in one of the 45 classes. The classes include Sunfish, 9 Trout species, several types of Bass, Pike and Salmon, as well as Blue Marlin and the great Barracuda.

"You and members of your family are eligible," says Mathews, "if you are employed in the manufacture of protective coatings, printing ink, linoleum, putty, calking compounds or allied products in the United States or Canada. To enter, all you need is an entry blank and, when possible, a snapshot of your fish." Entry blanks are available from R. S. Mathews, Archer-Daniels-Midland Co., 600 Roanoke Bldg., Minneapolis 2. Minn.

"Last year's Fish Derby included some real whoppers," says Mathews, "but don't neglect those panfish entries — they have the same chance at the big prizes as the larger species."

Fish Derby judges this year are Hugh Grey, editor of Field and Stream; Joseph F. Battley, president of the National Paint, Varnish and Lacquer Association; and Dr. Samuel Eddy, professor of zoology at the University of Minnesota.

T&W

1020 BASE

This nationally famous vehicle makes great profits for many of our paint manufacturers throughout the country. We have a large and steady production of it. Quality and performance are even better than before.

1020 BASE is the Industry's No. 1 vehicle for the production of self-sealing flats, enamel undercoaters, exterior primers, wall sealers, eggshell and semi-gloss enamels, asbestos shingle paints, deep tone finishes and a host of other finished products of outstanding merit.

1020 BASE positively excells in:
HOLDOUT — SEALING QUALITIES — READY MISCIBILITY
WEATHER RESISTANCE OUTDOORS — EASE OF FORMULATION
EASE OF BRUSH APPLICATION — CUSTOMER ACCEPTANCE

DEEP TONE FINISH PROBLEMS are easily solved by the use of 1020 BASE.

NOTHING ON THE MARKET TO EQUAL IT!

Write today for formulas and full particulars.

THE THIBAUT & WALKER CO. INC.
Leaders in Vehicles and Varnishes for the Trade!
GENERAL OFFICES, LONG ISLAND CITY 1, NEW YORK

THIBAUT & WALKER VEHICLES DEEPLY ROOTED IN THE PAINT INDUSTRY

Candid Shots of New York Production Club Annual Outing Held at Jumping Brook, Neptune, N. J., June 7

Los Angeles Paint & Varnish Production Club Meets June 11

The regular meeting of the Los Angeles Paint & Varnish Production Club, attended by 117 members and guests, was held at Scully's restaurant on June 11.

The following previously proposed members were voted into Class A membership: John Lewis, A & S Paints, Inc; James Walter Kay, Andrew Brown Company; F.E. Stewart, Southern Lacquer & Paint Corp.; N. E. Baker, Baker Company; Garnett E. Lutes, Sherwin-Williams Company; James K. Bell, Pittsburgh Plate Glass Company.

Two local members, Jerry M. Wills and Orval Birkett, both of the Andrew Brown Company, were also voted final approval.

John C. Weinman, director of research and development for the Reichhold Chemical Inc., the speaker of the evening, discussed his work on red pigments. He compared the most common red pigments used by the paint industry for such properties as hiding power, tinting strength, and color retention on the fadometer and weatherometer. Mr. Weinman's study was based on observation and exposure data of a series of synthetic enamels made up at constant thinner volume. The enamels included a number of types of red pigments, either alone or in combination to approximate the color of toluidene red. The study also included some letdowns with small percentages of titanium dioxide.

•

S-W Announces Two Major Appointments in Tech. Dept.

Two major appointments in the technical department of The Sherwin-Williams Co. were announced by technical director A. B. Holton.

H. J. L. Cotton of Cleveland was named technical coordinator for the paint company, responsible for the general supervision of technical department activities in the fields of industrial products finishes and transportation finishes.

H. E. Spitzer of Chicago was appointed Director of Development, with general supervision of the paint, varnish and lacquer development laboratories at Chicago.

Cotton has been identified with the Sherwin-Williams organization since graduating from the University of Michigan in 1920. He joined the Acme Quality Paint Co., formerly Acme White Lead & Color Works, a Detroit affiliate. In 1927 he was transferred to Cleveland as assistant to the director of varnish research. Two years ago he was named technical coordinator of industrial finishes, a function which he continues in his new position.

Spitzer, a graduate of North Dakota State College, started with the company in 1937. Since 1946 he has been in charge of the Chicago technical service department. His new position includes correlation of development activities with sales, research and production.

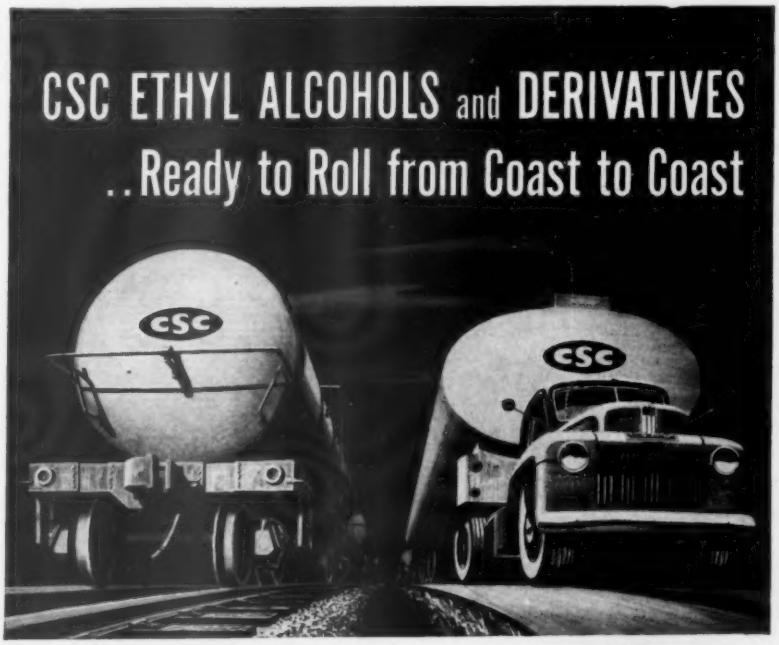
•

Offer List of Government Procurements for Paint

Paint manufacturers interested in securing government business can obtain current procurement information through "Invitations to Bid", a free listing service of government procurements for paint and allied products compiled by Nuodex Products Co., Inc., makers of driers and other chemical additives.

Bulletins are issued two or three times a week, as information about bids is collected by the Nuodex staff in Washington. Each issue shows the quantity and type of materials required, the specifications if any, the procurement office, the invitation numbers, the delivery points and the opening dates. Most of the material listed is priority rated and bids for as high as 100,000 gallons have appeared.

Paint manufacturers who would like to receive this free service should write on their letterhead to Nuodex Products Co., Inc., Bar Building, Washington 6, D.C.



Usage for industrial alcohols has reached an unparalleled level during the past decade . . . creating a demand that Commercial Solvents Corporation, a pioneer in alcohol research and production, has answered by producing more ethyl alcohols and derivatives for the chemical industry.

Over the supply lines of America move the CSC fleet of tank cars and tank trucks, bringing these essential chemicals to industry from its nationwide network of strategically located plants and distribution points . . . ready to offer you unsurpassed service.

CSC ethyl alcohols are available in all formulas and grades to meet the most exacting requirements of the pharmaceutical and industrial trades.

ALCOHOLS
Rossville Hexagon® Cologne Spirits
Rossville Algrain® Alcohol U.S.P.
Rossville Gold Shield® U.S.P.
Shellacol®
Quixol® Quakersol®

DERIVATIVES
Ethyl Acetate • Diethyl Maleate
Acetaldehyde

Write or phone Commercial Solvents Corporation, Industrial Chemicals Division, 260 Madison Ave., New York 16, N. Y. for full information.

OTHER CSC CHEMICALS

Butanol	Aminohydroxy Compounds
Butyl Lactate	Riboflavin Crystals
Butyl Acetate	Hydroxylammonium Salts
Butyl Stearate	Nitroparaffins
Dibutyl Phthalate	Formaldehyde N.F.
Tributyl Phosphate	Pentaerythritol
Methanol	Methylamines
Ammonia	
Acetone	

INDUSTRIAL CHEMICALS DIVISION
CSC COMMERCIAL SOLVENTS CORPORATION

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AMMONIA • NITROPARAFFINS • SOLVENTS • PLASTICIZERS • INTERMEDIATES

Philadelphia Paint and Varnish Production Club Meets May 21

One hundred twenty-nine members and guests were present at the regular meeting of the Philadelphia Paint and Varnish Production Club held May 21 at the Engineers Club.

President Don Munson introduced the following guests: C.P. Knauss, vice president of Reichhold Chemicals, Inc., and former Philadelphia Club president; P.J. Whitney, Sr., first president of Philadelphia Club; Felix Gzemski, Chairman of Philadelphia A.C.S.; Dr. Rogers, New York Production Club.

Al Stover, Technical Committee chairman, announced that the next regular meeting of his committee would be held Monday, June 2 at the Engineer's Club. Bob Wrenn, chairman of the production problems committee, reported that an average of twelve men attended each of their meetings, that they had visited eight plants in the area, and had had a very successful season.

The membership committee presented for first reading the names of Edward Van Romer, Harry L. Snell, and Walter J. Chrostek, all of the Benjamin Franklin Paint & Varnish Co. (all Class A). Eugene Smalley, of the Geo. D. Wetherill Varnish Co. was presented for second reading, and was unanimously voted into the club (Class A).

The following slate of officers were nominated and unanimously elected for 1952-53: president, A.W. Crompton; vice president, P.J. Whiteway, Jr.; secretary, F.M. McNerney; treasurer, J.A. Davis; assistant treasurer, D.T. Niven; advisory committee, H.W. Hibbert and R. Toothill; council representative, J.P. Harner.

Charles C.J. O'Connor was the guest speaker. Mr. O'Connor presented color movies of his travels, with a commentary on the films.

•

Howard S. Bunn Appointed President of Bakelite Co.

Howard S. Bunn has been appointed president of Bakelite Company, a division of Union Carbide and Carbon Corporation. Mr. Bunn has been vice president of Bakelite and of Carbide and Carbon Chemicals Company, both divisions of Union Carbide.

Mr. Bunn entered the Carbide organization in 1922 as a salesman of alloy specialties for the chemical industry. After several years as an advertising writer he became advertising manager for Carbide and Carbon Chemicals Company, and later served as manager of the Pyrofax division of that company. In 1938 he was appointed manager of the Plastics Division of Carbide and Carbon Chemicals.

In 1944 Mr. Bunn was made vice president, Plastics Division of Carbide and Carbon Chemicals Co., and vice president in charge of sales, Thermoplastics division of Bakelite. He is a director and vice president of Bakelite Company (Canada), a director of Bakelite Limited (England), a director and vice president of Canadian Resins and Chemicals, Limited, and a director of U.S. Testing co.

Mr. Bunn has degrees in chemistry and chemical engineering from Lehigh University. His active memberships include the American Chemical Society, Society of the Plastics Industry, Manufacturing Chemists Association, and the Chemists Club.

•

Central Paint & Varnish Buys Control of Hydroban

The Central Paint & Varnish Work, Inc., of Brooklyn, New York, has bought the controlling interest in Hydroban, Inc.

Hydroban is a primer, sealer, and water repellant which was developed forty years ago, and introduced commercially about two years ago.

Henry G. Voorhis, who was sales manager of Hydroban, Inc., has been retained as vice president in charge of Hydroban sales.

Personnel Changes

Godfrey L. Cabot, Inc.

Raymond P. Rossman has been named executive assistant to Owne J. Brown, Jr., vice president and general sales manager. Mr. Rossman has a Masters degree in physical chemistry from Massachusetts Institute of Technology. His work in the past few years has mainly been in technical sales and services of Cabot. Prior to his new appointment, Rossman served as technical liason representative between customers and the company carbon black manufacturing operation in the southwest.

Metals Disintegrating Company

James C. Grindey has been added to the Chicago sales office staff. He is former president of the Oroline Products Co., Chicago.

Celanese Corporation

W.D. Morrison has been appointed assistant manager of the product development department of the chemical division.

D.D. Hecht has been named director of the application laboratory at Newark, New Jersey.

Kinney Manufacturing Co.

William B. Mills has been appointed Philadelphia district manager for Kinney, makers of high vacuum and rotary pumps.

American Cyanamid Company

G.W. Busch has been named Chicago sales representative of the pigment department of the Calco Chemical Division. He is a member of the American Institute of Chemical Engineers.

Dewy and Almy

John C. McCarthy, Jr., has joined the adhesives and coatings division as a salesman. He will work in western New York, New Jersey, Pennsylvania, and the southern coastal states.

John G. Broughton has been added to the sales staff of the organic chemicals division.

Benjamin Gudzinowitz and **Malcolm Hecht, Jr.,** have joined the staff of the company's new plant at Acton, Mass.

Dow Chemical Company

Dr. R. H. Boundy has been named to head the company's research activities. **C.B. Branch** will replace Dr. Boundy as manager of the plastics department, and **John Van Horn** will replace Mr. Branch as manager of technical service and development.

Commercial Solvents Corp.

Richard C. Wood has been named assistant to Abbot K. Hamilton, vice president in charge of product divisions.

Atlas Powder Company

Glen P. Roddey, working from Buffalo, will service customers in northern and western New York State. William A. Kessel, operating from New York City, will service the rest of the state. William I. Pontius has been assigned to the Chicago office to cover parts of Illinois, Indiana, and Michigan. John Slaton has been moved from Chicago to Cincinnati to cover the state of Kentucky and the southern parts of Illinois, Indiana, and Ohio.

McDougal-Butler Company

Frank G. Penl has been appointed sales manager. He formerly held the post of sales manager of transportation finishes.

Do You Know the

5 Reasons Why

***most* leading manufacturers of high-grade enamels and other pigmented products have selected the *same* filter?**

MODELS available for all size batches, including laboratory and odd-lot work. MICRO-KLEAN has also been successful in filtering clear vehicles.

1. *Always a Smooth Finish.* Cuno MICRO-KLEAN Filter is guaranteed to remove, mechanically, *all* over-size pigments and contaminants.

2. *The Filter Fits the Grind.* A range of controlled cartridge densities gives the right degree of filtration for each grind.

3. *Each Batch is Run Without Stopping.* Exclusive "graded density in depth" prevents premature cartridge plugging . . . larger batches can be run with fewer cartridges.

4. *Easy to Clean the Filter.* Compact housing is easily disassembled and cleaned out at cartridge-replacement time.

5. *Less Filter Cost.* Greater MICRO-KLEAN capacity means fewer cartridges . . . cuts down replacement costs.

FOR PAINTS — Use Cuno AUTO-KLEAN Strainer, all-metal, continuously cleanable. Guaranteed to remove all particles larger than specified. Available spacings from .0035 in. up.

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Fluid Conditioning

Removes More Sizes of Solids from more Types of Fluids

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194 South Vine Street, Meriden, Conn.

Please send literature on MICRO-KLEAN for ..... (mention application)

Name..... Title.....

Address.....

City..... State.....

PLEASE ATTACH COUPON TO YOUR BUSINESS LETTERHEAD

American Can Company

C.H. Black has retired from his post as chairman of the board after 44 years with the firm. W.C. Stolk, re-elected as Canco's president, was designated chief executive officer.

D.B. Craver has been appointed general manager of sales. He was formerly manager of sales for the central division. Mr. Craver's appointment has resulted in the following promotions: **F.B. Newcomb,** manager of sales for the central division; **F.J. Dowling,** assistant manager of sales, central division; **R.D. Folk,** sales division manager, central district; and **R.G. Warmbold,** sales manager in Michigan.

Hercules Powder Company

J.G. Antonack has been appointed technical representative in Chicago for the Synthetics Department. He will replace **G.E. Osburn,** who has been transferred to Wilmington and appointed sales supervisor for Synthetics Department products.

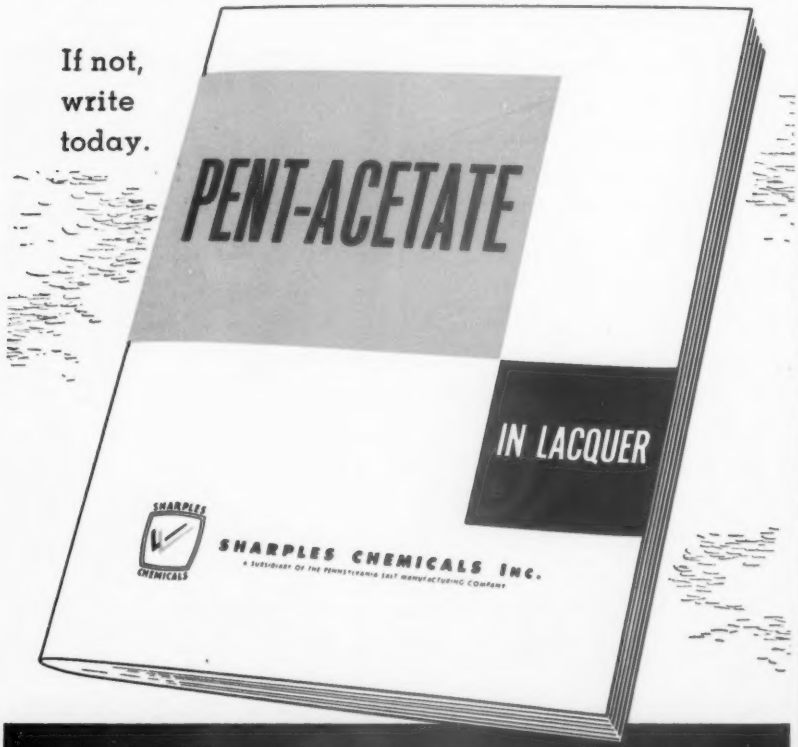
Charles A. Grant has been named Chicago District sales manager for the Cellulose products department. He succeeds **Emmet E. Hixon,** who will become service superintendent at the plant in Parlin, New Jersey. Mr. Grant is active in the Chicago chapter of the National Paint, Varnish and Lacquer Association.

Basic Varnish and Research Corp.

S.J. Caudiello has been appointed to the technical research division. He is a member of the New York Paint & Varnish Production Club and of the Institute of American Chemists.

Have you received your copy?

If not, write today.



SHARPLES CHEMICALS INC.
A SUBSIDIARY OF THE PENNSYLVANIA SALT MANUFACTURING COMPANY
500 Fifth Ave., New York • 80 E. Jackson Blvd., Chicago
Martin, Hoyt & Milne Inc., San Francisco • Los Angeles • Seattle • Portland
Shawinigan Chemicals, Ltd. • Montreal • Toronto
Airco Company International, New York

Robert W. Coerdt

Reichhold Chemicals, Inc.

Robert H. Coerdt has been appointed vice president in charge of the Cleveland district.

John M. Jernigan has been promoted to technical service director of the southern division in Tuscaloosa, Ala.

Pittsburgh Coke and Chemical Co.

W. Kenneth Menke has been elected to the newly created post of vice president in charge of chemicals.

Lamson Corporation

E.H. Woodberry has been named to the position of sales manager of the pallet loading line.

General Electric

Carl F. Olson has been named sales development supervisor for insulating materials at the chemical division alkyd resin products plant at Schenectedy, N.Y.

Dr. Glennard A. Lucas of the chemical division has been appointed a project engineer at the company's silicone plant in Waterford, N.Y., where he will have responsibility for development work on silicone rubber compounds. Dr. Lucas has a Ph.D. from Columbia Universtiy, and is a member of the American Chemical Society and Sigma Xi.

Tennessee Eastman Company

George J. Taylor has been added to the staff of the sales offices in New York City. He will represent the company primarily in the Philadelphia area.

Kenneth E. Cox has been named to the staff of the sales offices in Chicago.

E. Murray Williams has been appointed St. Louis representative for all Eastman Industrial Chemicals. He will cover Kansas, Oklahoma, Missouri, Arkansas, southern Illinois, Indiana, western Kentucky, and Tennessee. Mr. Williams offices are located in the Continental Building in St. Louis, Mo.

The FORMULATOR'S DIGEST

VEHICLES for Alkyd Based Flats and Rubber Based Flats

Alkydol S-2020

An inexpensive alkyd resin for the preparation of high grade, easy brushing, self-sealing flat wall enamels. Features fast-dry—flexibility and washability.

Alk-O-Mers 8106-8200

Companion vehicles developed for rubber base paints with better adhesion, washability and stability.

SPECIFICATIONS

	S-2020	ALK-O-MERS 8106	ALK-O-MERS 8200
Solid content by weight	49—51%	49—51%	48—50%
Solvent	Mineral Spirits	Water	Water
Viscosity, Gardner-Holdt Scale	U-V	21,000 cps	6,500 cps
Type of resin	Phthalate Alkyd Oil and Resin Modified	Alkyd Resin Emulsified	Rubber and Alkyd Resin Emulsified
Type of oil	Soyabean		

We Invite You—

to test these quality resins in your own formulations—write for test samples.

ALKYDOL *Laboratories, Inc.*

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Union Carbide and Carbon

Dr. W. Nelson Stoops has been made assistant director of research in physical chemistry at the South Charleston, West Virginia plant of the Carbide and Carbon Chemicals Company, a division of Union Carbide. He received a Ph.D. in physical chemistry from Princeton University, and is a member of the American Chemistry Society and the High Polymer Division of the American Physical Society.

N. S. Cassel

A. E. Gessler

Interchemical Corporation

Norman S. Cassel, has been elected vice president of the corporation. He succeeds Dr. A.E. Gessler, who becomes emeritus director of research. William J. Rothemich succeeds Mr. Cassel as divisional president of the Textile Colors Division.

Pratt & Lambert

Roy W. Lindsay has been elected president of Pratt & Lambert, Inc., of Buffalo, N.Y. He will succeed **Harold E. Webster,** who has been made board chairman.

Thibaut & Walker

Samuel C. Robison has been elected president and director of the Thibault & Walker Company of New York. Until his present appointment Mr. Robison served as vice president and technical director of the company. His recent association activities included the chairmanship of the Sub-committee for Kauri Reduction Study of A.S.T.M. Committee D-1.

Beckwith-Chandler Company

Herbert A. Johnson has been named sales manager of the auto refinish division. Beckwith-Chandler is a division of the Devoe & Raynolds Company.

General Electric

At the General Electric Chemical Division's Silicone Plant at Waterford, N. Y.

Jerome T. Coe has been named manager of sales development, **Robert Treat, Jr.** supervisor of customer service, and **John F. Bahn,** supervisor of sales administration and control.

Harold W. LeBoeuf has been appointed production supervisor.

H. H. Hill

W. T. Utley

Pittsburgh Plate Glass Co.

William T. Utley, director of the Ditzler Color Division, has retired. **Harold H. Hill** will succeed Mr. Utley as divisional director. Mr. Hill is a member of the Paint and Varnish, and Lacquer Association.

Look at... HYDROCARBON

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RESINS

AS A QUALITY ECONOMICAL RESIN IN OLEO RESINOUS VARNISHES

PANAREZ resins are compatible in oleo-resinous varnishes with phenolics, ester gums, hydrogenated rosins, coumarone-indene, and many other commonly used synthetic resins. These neutral and inexpensive varnish resins markedly improve chemical and mar resistance of protective finishes.

For economy—for uniformity and consistent high quality — for dependability — Pan American PANAREZ resins are unexcelled.

Whether you purchase in carload or single drum quantities, prompt "on time" shipments from plant, or conveniently located warehouses insures uninterrupted maintenance of production schedules.

	Color Gardner	Softening Point, °F	Iodine Number	Acid Number
PANAREZ 3-210	9	200-220	230	0-1
PANAREZ 6-210	11	200-220	170	0-1
PANAREZ 12-210	16	200-220	60	0-1

PAN AMERICAN CHEMICALS

PAN AMERICAN DIVISION *Pan American Refining Corp.* Chemicals

122 EAST 42ND STREET • NEW YORK 17, N. Y.

Hercules Powder Company Plans New Hydrocarbon Chemicals Plant

The Hercules Powder Company will build its new hydrocarbon chemicals plant on a 275 acre tract near Gibbstown, N.J. The new plant will be located on the Delaware River, slightly northwest of Gibbstown, between the Socony-Vacuum Oil Company plant and E.I. du Pont de Nemours & Company's Repauno plant. The plant, announced last January, will represent an investment of close to $8,000,000. It will employ seventy to eighty people at the outset.

Construction will start late this year or early next year, depending on the availability of building materials. The plant, to produce phenol, para-cresol, acetone and cymene alcohols, will cover about 60 acres of the tract. The additional acreage will provide for future expansion.

A site in the Delaware River industrial section was chosen because both propylene and benzene, required in the phenol manufacturing process, are available from petroleum refineries and coke ovens in this area. Terpenes, the raw materials for the new para-cresol process, will come from Hercules plants in Georgia and Mississippi.

The plant will produce phenols by a new process developed by Hercules. The new departure in phenol manufacturing centers around the production of organic hydro-peroxides as the basic intermediate step in converting hydrocarbons into phenols and cresols. The method does not consume sulfur or chlorine, basic raw materials that are now in critically short supply and which are ordinarily consumed in other processes used up to this time.

Phenol and para-cresol are the sources of many industrially important products — synthetic resins, disinfectants, dyes, and pharmaceuticals. Acetone is a versatile and important industrial solvent and chemical intermediate. Cymene alcohols have wide utility in flotation and as wetting agents.

•

Celanese Sets up Organization To Coordinate Foreign Affiliates

Celanese Corporation of America has established a new organization known as Celanese Central, S.A. to provide closer liaison with affiliates of the company in all countries except Canada. Kenneth G. Donald has been named president of the new organization.

Reichhold Chemicals Establishes Branch in Jacksonville, Fla.

Reichhold Chemicals, Inc., has established a new South Atlantic division at Jacksonville, Fla. With the opening of the new branch the company joins the field of cellulose chemistry to its activities in the coal tar and petroleum chemistry fields. Jacksonville was selected as the site for the new division because it is also a naval stores center, making it a convenient spot at which to carry out research into terpene derivatives.

The new plant brings to ten the number of Reichhold branches in the U.S., and twenty-eight the number throughout the world. Annual sales of resins and allied chemicals by RCI last year reached $100,000,000.

General manager of the Jacksonville division is R.B. Fellows, formerly sales manager of RCI's southern division at Tuscaloosa. He will be assisted by Ralph Johnson and Harry Crofton, transferred from the division at Elizabeth, N.J. Mr. Fellows is being succeeded as sales manager at Tuscaloosa by T.P. Shumaker.

•

Sparkler Manufacturing Company Opens West Coast Branch Office

The Sparkler Manufacturing Co., Mundelein, Ill., manufacturers of filtration equipment, have opened a branch office and warehouse on the West Coast. The new branch is located at 612 N. San Vicente Blvd., Los Angeles, 46, Calif. Richard E. Shields has been appointed West Coast sales manager.

R-B-H

Keeps Its Shine

R-B-H dispersion methods not only develop high initial gloss. Gloss is retained through rugged outdoor exposure tests.

Iron blue panels based on R-B-H dispersions showed initial Glossmeter readings of 86. After polishing the readings were 83.5. And after three months of Florida exposure the readings had dropped to only 81.5.

Reduction of agglomerates and thorough wetting of the pigment particles offer you retained gloss.

R-B-H . . . for finishes of integrity.

R-B-H *Dispersions*

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DISPERSION TECHNICIANS
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Pigment dispersions in nitrocellulose; ethyl cellulose; urea formaldehyde; vinyl and alkyd resins; chlorinated rubber and other plastic binders.
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For high quality at a reasonable cost, BALANCE your lacquer formulations with a small percentage of CARBIDE'S slow evaporating solvents. These slow solvents give better flow, higher gloss, more blush resistance—without appreciable increase in either cost or drying time. In many cases as little as 2 to 5 per cent of these solvents will add the top quality that sells low cost formulations.

Because your CARBIDE representative handles esters, ketones, glycol ethers, and alcohols he can give you impartial data on both the merits and limitations of these solvents. For a complete listing of CARBIDE solvents, call the local CARBIDE office or send for the booklet "Physical Properties of Synthetic Organic Chemicals" (Ask for F-6316).

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Butyl CELLOSOLVE

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CALENDAR OF EVENTS

Sept. 9-11. American Soybean Ass'n. Annual Convention, Purdue University, Lafayette, Ind.

Sept. 14-19. Fall Meeting of Div. of Paint, Varnish and Plastics Chemistry, ACS, Chalfonte-Haddon Hall, Atlantic City, N.J.

Oct. 8-10. American Tung Oil Ass'n. Annual Meeting, Admiral Semmes Hotel, Mobile, Ala.

Nov. 17-19. National Paint, Varnish and Lacquer Ass'n. Annual Convention, Palmer House, Chicago, Ill.

Nov. 20-22. Federation of Paint and Varnish Production Clubs Annual Meeting, Palmer House, Chicago, Ill.

Nov. 18-22. Paint Industries' Show, Palmer House, Chicago, Ill.

Production Club Meetings

Baltimore, 2nd Friday, Belvedere Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Cincinnati Club;
Dayton — Nov., Feb., April, Van Cleve Hotel;
Indianapolis — Sept., Claypool Hotel;
Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 2nd Thursday, No Fixed Place.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, Last Monday, El Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, Seven Seas Restaurant.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, Puritan Hotel, Boston.

New York, 1st Thursday, Building Trades Employers Assn.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings Only.

Philadelphia, 3rd Wednesday, Engineer's Club.

Pittsburgh, 1st Monday, Fort Pitt Hotel.

St. Louis, 2nd Tuesday, Forest Park Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Diana Sweets, Ltd.

Western New York, 1st Monday 40-8 Club, Buffalo.

PATENTS

Conducted by

Lancaster, Allwine & Rommel

PATENTS AND COPYRIGHTS

424 Bowen Building,
Washington, D. C.

Complete copies of any patents or trade-mark registration reported below may be obtained by sending 50c for each copy desired to Lancaster, Allwine & Rommel.

Coating Composition

U. S. Patent 2,591,904. John C. Zola, Arcadia, California.

A stable coating composition which comprises a dispersion of discrete particles of coating materials in an aqueous dispersing medium containing a suspension stabilizer, most of said particles being larger than 50 microns in size and certain of said particles being of different color than others of said particles.

Lacquer Composition

U. S. Patent 2,592,502. Harold Wittcoff and Wesley A. Jordan, Minneapolis, Minn., assignors to General Mills, Inc., a corporation of Delaware.

A lacquer composition comprising nitrocellulose, a nitrocellulose solvent, a plasticizer and a rosin acid ester of 2,2,6,6-tetramethylol-cyclohexanol.

Resin from Shellac and Resinols

U. S. Patent 2,591,623. Salimuzzaman Siddiqui, New Delhi, Krishen Kumar Sarin and Jyoti Prasad Varma, Poona, India, assignors to Council of Scientific and Industrial Research, New Delhi, India.

In the manufacture of plastic materials suitable for use as molding powders, coating compositions, adhesives and the like from resinols obtained from the pericarp of the nuts and incised trunks of plants belonging to the natural order Anacardiaceae, the process which comprises subjecting shellac mixed with such a resinol, in quantity amounting to at least about 18 per cent by weight, based on the weight of the shellac, and not substantially exceeding an equal part by weight, to the action of steam at a pressure within the range of from about 30 to 100 pounds per square inch, for a period ranging from about 1 to 5 hours until a homogeneous reaction product is obtained which is insoluble in hydrocarbon solvents but soluble in alcohol.

Glowproofing Composition

U.S. Patent 2,596,936. Morris L. Nielsen and Howard K. Nason, Dayton, Ohio, assignors to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

A glowproofing composition comprising the combination of a phenol-aldehyde resin and the water-insoluble reaction product of phosphoryl chloride and anhydrous ammonia, said water-insoluble product having a N/P ratio between 1.5:1 and 2.0:1.

Aluminum Coating Composition

U. S. Patent 2,591,646. William T. Walton and William Carl Spitzer, Chicago, Ill., assignors to The Sherwin-Williams Company, Cleveland, Ohio, a corporation of Ohio.

A prepared metallic coating composition characterized by its stability over long storage periods which consists essentially of a quantity of a metallic aluminum pigment having a tendency to generate hydrogen in the presence of water, a quantity of a varnish vehicle, and a quantity of plaster of Paris, the quantity of the plaster of Paris being effective to stabilize said composition against gas formation, said quantity of plaster of Paris being within the range of 0.25% to 10% by weight of the composition.

SPECIFICATION DATA

CALCIUM CHLORIDE	ASTM D 98-48
CAUSTIC SODA	P-S-631A
DIPENTENE	TT-D-376 and Navy Spec. 52-D-8
LITHARGE	TT-R-191A
PINE OIL	LLL-O-358 Class A & B and N.F.
PINE TAR all grades	JJJ-T-121
RED LEAD all grades	TT-R-191A
ROSIN all grades	LLL-R-626
SODA ASH	O-S-571B
TURPENTINE all grades	LLL-T-791B

Samples and detailed literature,
Technical Assistance available upon request.

JOHN H. CALO COMPANY
INCORPORATED

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WHITEHALL 3-6866

Fire Retarding Coating

U.S. Patent 2,596,939. Morris L. Nielsen and Paul E. Marling, Dayton, Ohio, assignors to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

A fire-retarding coating composition consisting of a dispersion of water, the water-insoluble reaction product of phosphoryl chloride and anhydrous ammonia, said water-insoluble product having a nitrogen/phosphorus ratio between 1.72:1 and 1.80:1, a resin selected from the group consisting of amine-aldehyde and amide-aldehyde resins, and as a plasticizer therefor a polyhydroxyl compound of the group consisting of mannitol, sorbitol and pentaerythritol, which plasticizer is present in said fire-retarding composition to the extent of from 1% to 10% by weight based upon the weight of the said aldehyde resin.

Coating Composition

U.S. Patent 2,596,938. Morris L. Nielsen, Russel W. Arnold, and Earl C. Chapin, Dayton, Ohio, assignors to Monsanto Chemical Company, St. Louis, Mo., a corporation of Delaware.

A film-forming coating composition characterized by fire-retarding properties, said coating composition being composed of a dispersion of water and the following components dispersed therein:

	Per cent
Water-soluble resin selected from the group consisting of melamine-formaldehyde and urea-formaldehyde condensation products	10-50
The water-insoluble reaction product of phosphoryl chloride and anhydrous ammonia, having a N/P ratio within the range of 1.72:1 to 1.85:1	10-90
Water-soluble alkyd resin from α-hydroxy polycarboxylic acid and a polyhydric aliphatic compound	3-25

wherein the percentage compositions refer to the total solids.

Heat-Resistant Coating

U.S. Patent 2,595,676. Morris Kaufman and Alan Fowler Williams, London, England, assignors to C.D. Patents Limited, London, England, a British Company.

A process for the manufacture of an organic paint or varnish having good heat-resisting properties which process comprises the copolymerization of, by weight, one part of acenaphthylene, 10 parts of styrene and 2 parts of a drying oil by the action of heat in the presence of a terpene.

Asphalt Floor Coating

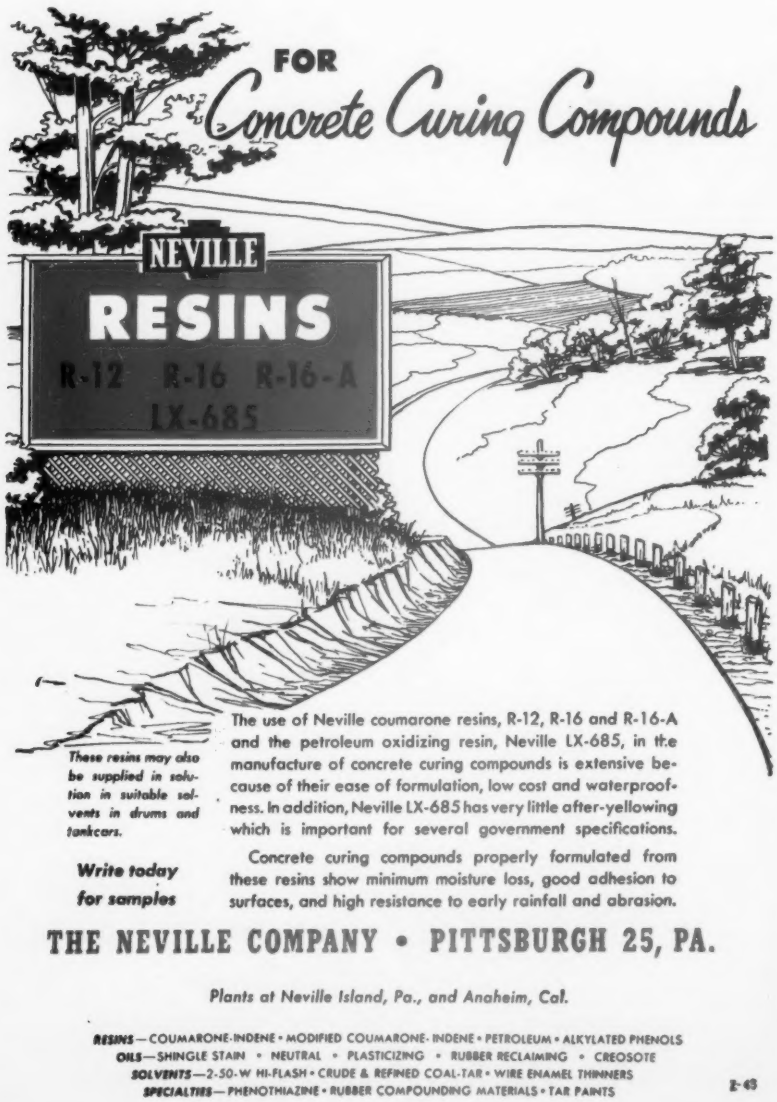
U.S. Patent 2,596,323. Annis G. Assaf, Auburndale, Mass., assignor to Commonwealth Research Laboratories, Boston, Mass., a partnership.

A liquid vehicle for use in a coating composition comprising asphalt dissolved in a solvent comprising 25 to 50 per cent of a liquid aromatic hydrocarbon selected from the group consisting of benzol, toluol and xylol and 50 to 75 per cent of a lower aliphatic acetate ester, the amount of asphalt being sufficient to render the vehicle adapted to receive and form a sticky, non-trowelable mastic with a major proportion of solid aggregate filler material and the addition of alcohol thereto being effective to cause a two phase separation and render the mastic plastic and cohesive and of such non-sticky character that it can be spread with a trowel.

Dehydration of Castor Oil

U.S. Patent 2,598,108. Ronald James Carter and Mary Bristow, Slough, England, assignors to Imperial Chemical Industries Ltd., a corporation of Great Britain.

A process of dehydrating castor oil which comprises heating castor oil in the presence of ortho-phosphorous acid.



These resins may also be supplied in solution in suitable solvents in drums and tankcars.

The use of Neville coumarone resins, R-12, R-16 and R-16-A and the petroleum oxidizing resin, Neville LX-685, in the manufacture of concrete curing compounds is extensive because of their ease of formulation, low cost and waterproofness. In addition, Neville LX-685 has very little after-yellowing which is important for several government specifications.

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Concrete curing compounds properly formulated from these resins show minimum moisture loss, good adhesion to surfaces, and high resistance to early rainfall and abrasion.

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RESINS—COUMARONE-INDENE • MODIFIED COUMARONE-INDENE • PETROLEUM • ALKYLATED PHENOLS
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SOLVENTS—2-50-W HI-FLASH • CRUDE & REFINED COAL-TAR • WIRE ENAMEL THINNERS
SPECIALTIES—PHENOTHIAZINE • RUBBER COMPOUNDING MATERIALS • TAR PAINTS

E-43

LANCASTER, ALLWINE & ROMMEL
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•

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Patent Practice before U. S. Patent Office. Validity and Infringements Investigations and Opinions.
Booklet and form "Evidence of Conception" forwarded upon request.

object of this approach being the reduction of data on paints and on paint films to reproducible quantitative measurement. These measurements can be expressed in symbols and manipulated algebraically. More precise control in formulation, establishment of trend data, and more realistic prediction of performance are the first available advantages. This viewpoint gives a new tool to users who have to evaluate, purchase and control the application of paints.

Current literature reports this trend. You see data on measurement of film density, film permeability, film strength. Surveys are in progress on the effect of substrate on paint performance. The paint film can be standardized for density, adhesion, weight change on final cure.

The trend is also apparent in more extensive physical characterization of paints before application. There is a rapidly increasing technology of paint rheology, pigment flocculation, pigment surface-vehicle reactions, crystal structure of pigments and factors considered in an interpretation of oil absorption.

Aims

TO keep its own inventory of facts secure, the Paint Development Team starts experimental testing as soon as new materials, problems or data become available. It develops new tests constantly and rapidly discards obsolete tests, methods and data. It constantly interprets data on final property of paints to components and ratios of components, and arranges pattern data on same. It does not consider any formulation as the best. It constantly considers and evaluates new fields and new approaches. It looks to reduce operation to a systematic and economical basis.

To keep its management fully prepared for realistic action, the Development team —

Simplifies problems to components of prime technical importance.

Aims to the most rapid solution of problem at hand consistent with necessary coordinate information.

Interprets technical trends to management — transmits details as to commercial possibilities arising from technical advantages.

Prepares to move faster than competition once a course is decided on.

•

Announce Price Reductions On Du Pont's Dimethyl Formamide

Price reductions on dimethyl formamide (DMF), a new solvent, have been announced by the Du Pont Company's Grasselli Chemicals Department. The reductions range up to 20 per cent. This is the second price decrease since DMF was introduced as a commercially available product just over two years ago.

DMF has an affinity for a wide variety of hard-to-dissolve organic and inorganic materials. Its powerful solvent action on hydrocarbon and acid gases, synthetic resins, inorganic salts and pigments lends it to such uses as a gas recovery solvent, reaction medium, and general processing solvent.

Representative of the price reductions is the decrease in tank car lots from 53 cents to 42 cents per pound, f. o. b. Strang, Texas.

THE FOURTH DICALITE PLANT

...will add approximately 80% increased production capacity for Dicalite calcined and processed filteraids and fillers

The new plant of the Dicalite Division, Great Lakes Carbon Corporation, at Lompoc, Calif., is now in volume production at a continually increasing rate. It represents over 5 years of engineering, design and construction, and is the largest complete unit for processing diatomite built in the last 22 years. Full designed output will add approximately 80% increased production capacity for Dicalite calcined and processed filteraids, fillers and other materials.

Four Dicalite plants are now running 24 hours a day to produce the maximum tonnage of Dicalite materials to supply the emergency demand.

Even during this extreme pressure for volume production, specifications for performance and quality of each product are readily maintained. Research data are being accumulated to aid in developing new and improved Dicalite products for future industrial use.

DICALITE DIVISION GREAT LAKES CARBON CORPORATION

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turer of Industrial Aromati

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b about dispersions, both organoso and plastisols, are these: (1) their investment and operating costs are low; (2) they are amazingly versatile in use; and (3) the quality of the products they make possible is high. With this combination, it is not difficult to understand their growing commercial importance.

Uses of the Dispersions

AT THE present time, all of the commercial applications of the organosols and plastisols involve the use of at least some plasticizer. Organosols have much wider formulating latitude in this regard, and tend to be favored where less plasticizer is desired, where viscosities must be lower, or where flow properties must be more closely regulated. Plastisols are preferred where volatile diluents cannot be tolerated.

Vinyl-coated cloth is probably familiar to everyone. It is available in a wide range of colors, with numerous types of embossed effects and surface finishes. Much of this is coated by the dispersion technique. The organosol or plastisol is spread onto the cloth by a doctor knife, after which the cloth goes through a baking oven which dries it and fuses the coating to optimum strength. Heavy coatings can be applied in only a few passes. Also, with the dispersion technique, the composition can be varied from one coat to the next, often producing superior results.

Unsupported film is manufactured by a somewhat similar method. Organosols are applied by a reverse roller coater to well-sized paper, which serves as support during the baking and final fusing operations, after which the paper is stripped off and reversed. One large producer has developed a process of printing designs directly on the paper, using vinyl resin solution inks. The organosol is applied over this and fused, and the design transfers to the film. Since it is much easier to print on paper than on film, multi-color designs present no problem at all.

Of course, organosols can be applied to paper and left on it to make coated paper. In addition to the usual applications which come to mind in such a process, a promising new low-priced floor covering has been produced this way. A special paper is coated with an organosol base color and designs are printed on this with vinyl inks. Over the top of the inks, a clear organosol or plastisol film is applied and fused, then the whole sheet is laminated to an asphalt-impregnated paper felt base. This floor covering wears remarkably well, and the clear, tough top coat makes it easy to clean and unusually resistant to marking.

Many types of articles are coated with organosols or plastisols by the dipping process. Among these are racks for the electroplating industry, dish drainer racks, cotton gloves for industrial use, tool handles, and many others. Unsupported plastic articles can also be made by dipping, fusing the film, and stripping the coating from the forms. Overshoes, gloves, industrial fertilizer and seed tubes, and several others are made thus.

Other applications of dispersion coatings are casting printing rolls, coating flexible metal cable covering, coating wire, coating all kinds of threads, impregnating fiber batts to make railroad tie pads — to mention but a few.

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"Our primary concern . . . a more uniform product of better quality has been fully realized. Information available indicates a worthwhile saving not only over the previous method, but also over original estimates for gas firing." Thus the plant manager sums up the results of oil and resin cooking on Selas Duradiant settings.
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Several of the experimental metal finishes based on organosols have amazing toughness and wear resistance, several orders of magnitude better than even the vinyl resin solution coatings. These are just beginning to find commercial use, and are certainly destined to grow.

In fact, the entire vinyl resin industry is certainly destined to continue growing. And with their combination of great versatility, low cost, and high quality, the vinyl resin dispersions will certainly account for a very large share of this overall growth.

•

Witco Announces Oil Black Div.

Witco Chemical Company has organized an Oil Black Division which includes the Continental Carbon Company plant in Sunray, Texas, and the Continental Oil Black plant in Westlake, Louisiana.

J. H. Wishnick and R. A. Reinke have been appointed manager and general superintendent respectively of the new division.

Remove "Fish Eyes", Skins, Incidental Solids and Semi-Solids from Varnish and Lacquer with . . . .

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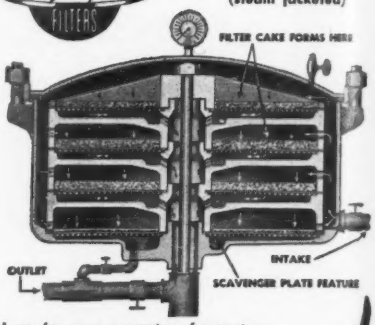
Model 18-S-12 Varnish Filter (steam jacketed)

Many varnish makers now use Sparkler Filters to clarify varnish, lacquers, and other clear liquids. The brilliance and polish obtained by filtering with Sparkler Filters is far superior to results obtained with other methods of clarifying paint products.

Our engineers are ready to give personal attention to your problems.

Write Mr. W. J. Kracklauer.



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Standard-Toch Names Laboratory Div. Heads

Announcement has been made by Milford H. Corbin, president of Standard-Toch Chemicals, Inc., of the appointments of John Ostock as manager of laboratories of the eastern division and R. G. Gohman as manager of laboratories of the western division.

John Ostock is a graduate of Polytechnic Institute of Brooklyn, N. Y., where he received his B.S. degree, and is a member of the American Chemical Society and the New York Paint Production Club. He has been associated with the organization for many years. Mr. Ostock, whose intensive field service over a period of years, supplemented by extensive research and development activities, has contributed many technical developments in specialized finishes over a wide field including insulation, metallizing and plastics.

R. G. Gohman received his B.S. degree at Wabash College of Crawfordsville, Ind., and is a member of the American Chemical Society. His activities in the industry and with the organization extends over many years. He is responsible for many technical improvements in the application of paint and lacquer. His contribution in the field of research and development involving coatings for product finishing has been marked by many outstanding achievements.

Staff of Rinshed-Mason Hears Talk on Iron Oxide Pigments

Irwin C. Clare, Research Specialist, C. K. Williams & Co., recently addressed the Technical Staff of the Rinshed-Mason Co., Detroit, Michigan. Mr. Clare discussed natural and synthetic iron oxide pigments.

He pointed out that synthetic red, yellow, black, and brown oxides have contributed an important advancement in brightness, tinting strength, suspension, uniformity, and dependability of supply. The natural oxides, even though they lack the brightness of color of the synthetics, are expecially useful in special applications such as automotive undercoaters. Here they have advantageous effects on adhesion, sanding, and water immersion resistance. They also find use in rust-inhibitive shop coats.

Mr. Clare presented other important uses of iron oxides such as the formulation of infrared reflecting specification paints where reflectances approaching that of natural terrain are required.

CLASSIFIED ADVERTISEMENTS

Rates: $.20 per word, except those seeking employment, for which rate is $.10 per word. Minimum: ten words. Address all replies to Box Number, c/o Paint and Varnish Production, 855 Avenue of the Americas, New York 1, New York.

PAINT CHEMIST WANTED — man with three to five years experience in the formulation of trade sales finishes. Excellent opportunity with Raw Material Sales Service Laboratory in New York Metropolitan area. Advise salary desired in reply. All answers will be kept in strictest confidence. Box 142

CHEMIST WANTED — Well known miners and manufacturers Talc and Mineral Fillers have opening for experienced chemist. Experience in paint formulation, fine grinding, particle separation, insecticides helpful. Opportunity for right man with real ambition whose interest is in developing new products, testing, quality control. Permanent position only. Send complete data including education, experience, age, etc. Satisfactory salary and housing allowance. Our personnel knows of this ad. All replies confidential. Carbola Chemical Co., Inc., Natural Bridge, N. Y.

TECHNICAL Bulletins

SYNTHETIC WAXES

Synthetic waxes of a wide range of physical properties are fully described in the new catalog "Synthetic Waxes by Glyco".

This 16 page catalog gives tables of specifications for these waxes. The synthetic waxes include amide and ester types. They range in melting points from 55°C. to 143°C. and in hardness from soft, plastic to hard and brittle. They are generally light in color, white to tan. Some are insoluble in water and others are dispersible in water. Many are insoluble in solvents except at their melting points. They are compatible with natural and synthetic waxes and resins.

Use data are listed for such applications as coatings, lubricants, anti-tack agents, electrical insulants, drawing compounds, flatting agents, release agents, adhesives, etc. They find use in the following industries: leather packings, paint, plastics, rubbers, metals, textiles, electrical, asphalt, polishes, plating, adhesives and paper.

Copies of the new issue of "Synthetic Waxes" are available on request from Glyco Products Co., Inc., 26 Court Street, Brooklyn 2, N.Y.

METHYLCYCLOHEXYL STEARATE

A technical service report, E-2, gives the properties and uses of Witco methylcyclohexyl stearate. This product is a clear, straw-yellow, oily liquid which solidifies at temperatures below 10 degrees C. and is relatively non-volatile. It is used in the rubber and plastics industries as a plasticizer and is of value in plasticizing chlorinated rubber as well as swelling both crude and vulcanized rubber.

In the plastics field it is used as a mold lubricant for phenolformaldehyde and shellac molding compounds. It also improves water resistance. When used in cellulose nitrate and acetate with a solvent type plasticizer, it improves the gloss. It is an excellent solvent for ester gum, dammar, coumarone and cyclohexanone resins.

For copies of technical service report E-2, write to Witco Chemical Company, 295 Madison Avenue, New York 17, New York.

INDUSTRIAL DUST CONTROL

The Pangborn Corporation, Hagerstown, Maryland offers a 28-page, two-color bulletin entitled The Control of Industrial Dust. Purpose of the book is to describe Pangborn Dust Control and its many applications. Case histories of users of Pangborn equipment are documented with photographs and performance data indicating savings achieved through the installation of dust control equipment.

For copies of this bulletin — Bulletin Number 909A — write to the Pangborn Corporation, Hagerstown, Maryland.

FATTY ACID CHART

This chart includes the composition and important physical properties of the 46 most widely used processing oils and fats. Approximately 17" x 11", printed in two colors on durable stock, it shows at a glance such useful data as an oil's iodine number, saponification value, per cent of unsaponifiables and its normal fatty acid composition.

Chats about Finishes

CONCERNING STABILIZED PARLON®

by

FRED K. SHANKWEILER

Supervisor of Hercules' Chlorinated Products Sales

One of the major postwar developments in the industry has undoubtedly been the boom in rubber-base paints. Improving on chlorinated rubber formulas still further, Hercules recently introduced a stabilized grade which contains an epoxy-type stabilizer that is water insoluble, and compatible with resins and solvents normally used in formulating finished paints.

Stabilized Parlon—readily available at no extra cost—greatly improves heat stability, weathers better, and reduces under-film rusting. It retains the natural advantages of original Parlon—used for years because of its high resistance to alkalies, acids, fumes, and other corrosive elements.

If you'll write to me, I'll send a generous testing sample, and necessary technical data.

Fred K. Shankweiler

HERCULES POWDER COMPANY INCORPORATED

Cellulose Products Dept., 926 Market St., Wilmington 99, Del.

ICSS-4

In addition, the chart provides the empirical formulae, molecular weights and acid numbers of 23 fatty acids in common use. For many of these fatty acids, the boiling and melting points in Centigrade are also specified.

The chart is available by writing to the Technical Products Division of E. F. Drew & Co., Inc., 15 East 26th Street, New York 10, N.Y.

TRUCKS

Twelve-page condensed Truck catalog (Form 508-B) has been released by the Howe Scale Company, Rutland, Vermont. Specifications and illustrations are shown for the complete line of the latest Howe two and four-wheel hand trucks, trailer trucks, baggage wagons, platform skids, dollies, lift jack systems, wheels, casters and molded-on rubber tired wheels.

ALKYD SOLUTION

Alkydol Laboratories, Inc. has published a 5 page report, "Performance of S-1192, S-1196, and S-4502," which describes the performance of these newly developed modified alkyd resin solutions. S-1192 and S-4502 for architectural enamels and S-1196 for baking enamels exhibit all the advantages of alkyd resins plus improved alkali resistance, and color and gloss retention. The report describes the actual tests and results obtained in comparison with standard alkyd resin. The report is available upon request. Alkydol Laboratories, Inc., 3242 So. 50th Ave., Cicero 50, Ill.

CALCIUM DRIERS

Technical information on Nuodex calciums as auxiliary driers for paints and varnishes is contained in a new four-page folder. Available through Nuodex Products Co., Inc. of Elizabeth, N. J., the booklet describes three types of calcium driers — naphthenate, tallate and octoate.

The folder also gives specific recommendations for the use of calcium in vehicles showing poor tolerance, in fume-proof finishes, in sanitary coatings, in maleic treated oils, and in penta alkyds. A section discusses how calcium can help cut top drier usage and yet maintain optimum drying characteristics.

TUNG LITERATURE

References and abstracts of some 3,000 articles and patents relating to tung tree, processing of the fruit, chemistry and technology of the oil and meal have been compiled by R. W. Planck and Frank C. Pack of the Dept. of Agriculture's Southern Regional Research Laboratory, in collaboration with Dorothy B. Saku of the New Orleans Branch of the Department's Library. This work is entitled "Abstract Bibliography of the Chemistry and Technology of Tung Products, 1875-1950" and identified as AIC-317. Copies may be obtained by writing the Southern Regional Research Laboratory, 2100 Robert E. Lee Blvd., New Orleans 19, La.

COATING INTERMEDIATE

R-108 coating intermediate is discussed in a technical bulletin issued by the Chemical Div., General Electric Co., Pittsfield, Mass. Important factors covered are physical properties of the resin, suggested formulation, pigmentation, surface preparation for applying coatings formulated with this particular intermediate, suggested method of application and uses, and physical and chemical properties of the cured film.

How Black is Black?

The Cabot Nigrometer measures the degree

Cabot Black	Nigrometer Scale (color value)
Sterling R	99
Sterling V	96
Sterling 10	94
Sterling 99R	93
Monarch 81	81
Elf 0	80
Monarch 74	74
Monarch 71	71
Supercarbovar	69
Carbolac 46	65
Carbolac 1	58

Cabot Paint Blacks Give a Complete Range

We call it the Scale Test, and every single Cabot carbon black is subjected to it. It is accomplished by the use of a very delicate instrument called the Nigrometer, a modified reflectometer which measures the "blackness" of a black from the amount of light reflected from a specially prepared paste of black and linseed oil. It is a direct indication of particle size, a very important property of special blacks.

Note — Low Scale indicates intense blackness, high oil absorption, more viscosity. High Scale indicates less blackness, low oil absorption, less viscosity.

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Does RAYBO have the solution to your paint problem?

Many a technical man has found the answer to his problem among these RAYBO chemicals:

RAYBO 3—CONTROLS FLOODING AND SILKING
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Perhaps one of them is the key to improvement of your product. Why not send for a Technical Bulletin and sample?

RAYBO research is developing other problem-solving chemicals. Write us if you feel we might be of help.

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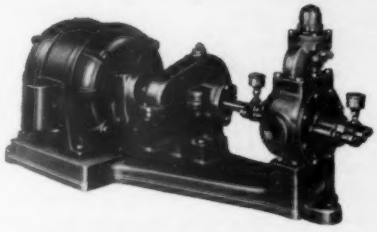
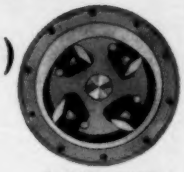
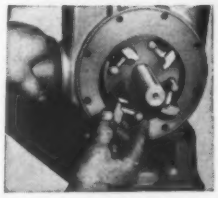




2 VANE TYPES



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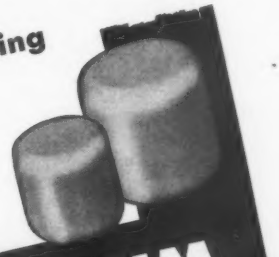

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Get The MAGNESIUM SILICATE (Talc) You Need!

200 MESH
325 MESH
LO-MICRON

Good white color
Stays in suspension
Adds toughness to paint film
Controls film lustre

Call on Whittaker
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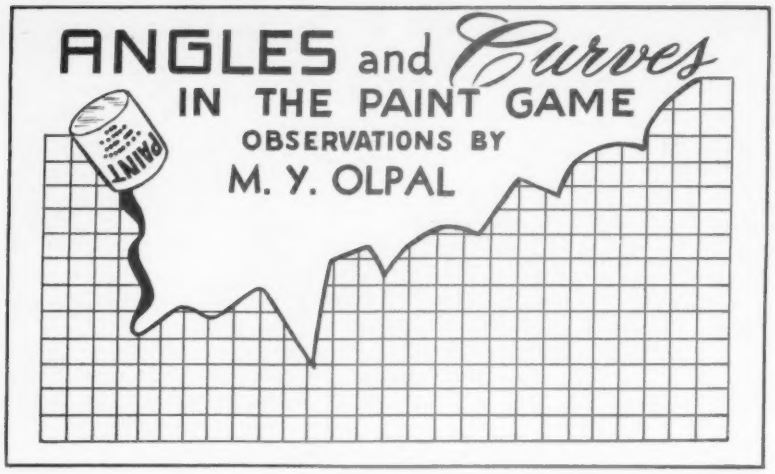

The boss and I were walking up the path to the plant. It was a hot day in July. We were in the midst of one of our usual summer heat waves. I wiped off my brow and the band of my hat with my handkerchief and then replaced the hat. "Can't afford to have that growing bald spot get sunburned," I thought to myself.

When we entered the plant, the boss and I nodded a parting greeting to each other. He turned to the right to enter his office, while I turned to the left. As I was about to open the door to my office, I stopped suddenly. I didn't know if it was that last Martini I had had at lunch or not. Quick as a flash I snatched off my sun glasses and stared.

Jane was standing on a chair trying to reach the venetian blind which had gotten stuck somehow. I just stood there and watched with my mouth agape.

Jane was dressed for summer. She was wearing one of those cool sheer things — all printed with flowers and leaves. But I wasn't looking at the flowers.

I sighed when she finally released the blind and stepped down from the chair. As she turned I opened the door as if I had just arrived. She gave me a quick glance and then looked at me hard.

"What's the matter with you? Are you having a stroke or something?" she asked.

I shook my head. "Just too warm, that's all."

Quickly I pulled some papers out of the drawer and started looking them over. But I didn't see what was written. I was trying to figure out how the venetian blind had gotten stuck. If I could solve that problem, maybe this summer wouldn't be so bad after all. In fact, I might even change my vacation to sometime in the winter.

Jane interrupted my day dreams when she dropped the month's expense accounts on my desk. Quickly I glanced them over. When I came to Joe's, I shook my head.

"What's the matter?" Jane asked.

"Nothing. That's just it. Joe's been working on this paint for that automobile account for six months now and still no results."

Jane's eyebrows flicked up. "I thought you told the boss it would take at least a year to crack that one. What are you complaining about?"

"I know it," I sputtered, caught in my own trap. "But tell me, Janie, has it ever occurred to you how similar the paint business is to your social life?"

Janie's brows puckered as she frowned slightly. As she reached up to primp her hair, she replied. "No, Mr. Olpal. Where's the connection?"

I leaned back in my reclining arm chair. "It's simple. You go out on dates, don't you?"

She nodded.

"Well, then. For you, men are a product — a commodity. Without men, you wouldn't have dates."

Janie gave a little giggle. "I've never noticed any shortage."

I smiled in reply. "You wouldn't. But I was just supposing. Now with us, paint is a commodity. It is the product we sell. And without a product we don't make money. Now if Joe could come through with a product before our time estimate, it would really show up swell on our profit and loss statement."

Janie giggled again. "I've always considered men as a necessary evil."

I nodded. "That's it exactly, Janie. A product is a necessary evil in order to make money."

CORROSION

(*From Page 27*)

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counts for the presence of localized rusting which is often observed in sections of large surfaces. It also explains the rather slow corrosion of zinc coated steel in those areas where some corrosion has commenced, as compared to the rather rapid rusting of tin coated steel which follows any initial points of rusting. It therefore can be readily seen that not only excellent waterproofing and weathering properties are required of a product to prevent disintergration, but good dielectric properties are also needed. Of course such a product is not always feasible for use in cases of corrosion. The stringency of the methods selected to prevent corrosion depends upon the treatment to which the surface will be ultimately subjected.

Not much is generally known and understood why certain solvents employed in the manufacture of paints, will have a corroding effect upon certain metals. This is true in the case of oxygenated type of solvents, whose evaporative rate is comparatively slow. Impurities in solvents can also cause corrosion.

Non-Polar Materials

As indicated, non-polar materials that can provide a fair degree of waterproofness, can be employed to manufacture a good paint that will prevent corrosion. For this reason, latex emulsion paints composed of copolymers of styrene and butadiene should prove highly useful. These paints are being to be employed more extensively; the composition of such paints may be changed by altering the percentage of styrene and butadiene to obtain slightly different physical properties for the exposed dried film of the applied paint. To cite another instance where a non-polar material can be of great use to the

corrosion engineer, is a specially formulated non-oxidizing rubberized asphalt type of coating. This material is of special use on the superstructure of oil drilling platforms, which are over salt water areas. This rubberized asphalt is applied in two coats on to the steel platform of the superstructure. When both coats have sufficiently dried, a zinc dust, zinc oxide paint is applied directly on top of the rubberized asphalt coating. The latter because of excellent dielectric properties, waterproofing and adhesive qualities to steel, prevents attack of corrosion and also precludes the action of the zinc dust on metal of the platform to start corrosion. This same rubberized asphaltic applied coating has been employed as a waterproof, weatherproof and corrosion resistant coating on outside heat insulated pipe lines and equipment at the rate of two coats of 50 sq. feet per gallon, for a final dry film thickness of 1/32". It has done an excellent job to provide the necessary protection of waterproofness and corrosion resistance to the insulation material on metal surfaces of the pipe lines and equipment.

As already explained elsewhere in this article, corrosion is the result of the attraction between two polar molecules of unequal intensity within a given field of force. Suppose we were to consider the degree of galvanic corrosion that can occur when two dissimilar metals are in contact with each other and exposed to a corrosive liquid or conductive solution. As every one knows, a potential is set up between the two metals and an electric current flows. By means of the electrochemical series as indicated below, it is possible to predict what will happen.

+ Magnesium
Zinc
Aluminum
Steel or Iron
Lead
Nickel
Brass
Copper
Bronze
Silver
Graphite
Gold
– Platinum

This practical series indicates that when two dissimilar metals are in contact, the one higher or more electropositive in the series will corrode in preference to the other, and the distance they are apart in the series, denotes the extent of the galvanic attack. The greater the degree of electropositivity of the metal, the greater the degree of corrosion. On the other hand, the further distance apart, the lesser the degree of attraction because of the reduced intensity of the field of force, and therefore a minimum or no corrosion at all. To resist corrosion therefore, the film of an applied coating must be free from materials containing molecules of intense polar activity. They also should have heat stability, weather resistance and water repellency or waterproofness, because to be deficient in these properties, only aids and abets corrosion. They should also be resistant to ultra-violet radiation and to the oxidizing effects of many chemicals as well. An added feature would be for the applied coating to have definite electrical insulating or dielectric properties.

Dr. J. V. Steinle, research and development vice president of S. C. Johnson & Son, Inc. and Dr. Percey L. Julian, Director of research and manager of fine chemicals of the Glidden Company Soya Products Division. Dr. Julian, a leading authority on sterol chemistry, consulted with members of Johnson's staff on a new development in the field of wax chemistry being developed in the Johnson laboratories at Racine, Wis.

SYLOID 308 makes it possible for you to realize new high standards in flatting efficiency . . . producing a modern flat finish at a lower cost. Mill room savings are increased because Syloid mill bases can be made highly concentrated with a very short grinding time. Capacity is often doubled . . . less flatting agent is required.

SYLOID 308 is a finely-sized synthetic silica of extremely high purity. Particle size is controlled to give uniformity in flatting results.

For information on how you can flatten finishes . . . economically . . . uniformly with **SYLOID 308** . . . for help on a specific problem . . . write Davison's Technical Service Department.

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PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS, AND SILICOFLUORIDES. SOLE PRODUCERS OF DAVCO GRANULATED FERTILIZERS

AMERICAN CHEMICAL PAINT COMPANY

AMBLER CHEMICALS ACP PROCESSES PENNA.

Technical Service Data Sheet

Subject: IMPROVING PAINT ADHESION ON STEEL WITH GRANODINE®

INTRODUCTION

"Granodine" is a zinc phosphate coating chemical which improves paint adhesion on steel, iron and zinc surfaces. In the Granodizing process, a non-metallic crystalline coating is formed on the treated metal. This bond holds and protects the paint finish and thus preserves the metal underneath.

Official Dept. of Defense Photograph

An F4U Corsair with the Navy's new aircraft anti-tank rocket, the "RAM". A Grade I zinc phosphate finish (JAN-C-490) protects the entire external surface of this rocket and provides a durable bond for the specification paint finish.

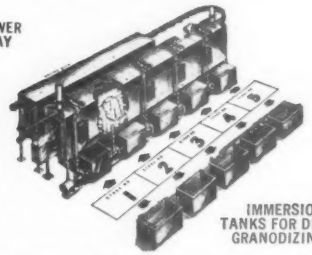
"GRANODINE" MEETS SERVICE SPECIFICATIONS

JAN-C-490, Grade I	CLEANING AND PREPARATION OF FERROUS METAL SURFACES FOR ORGANIC PROTECTIVE COATINGS
JAN-F-495	FINISHES FOR EQUIPMENT HARDWARE
U.S.A. 57-0-2C Type II, Class C	FINISHES, PROTECTIVE, FOR IRON AND STEEL PARTS
U.S.A. 51-70-1, Finish 22.02, Class C	PAINTING AND FINISHING OF FIRE CONTROL INSTRUMENTS; GENERAL SPECIFICATION FOR
MIL-V-3329	VEHICLES, COMBAT, SELF-PROPELLED AND TOWED; GENERAL REQUIREMENTS FOR

GRANODIZING DATA

Granodizing is an easily applied chemical process. Depending on the size, nature and volume of production, Granodizing can be carried out by spraying the parts in successive stages of a power washing machine, by dipping the work in the cleaning, rinsing and coating baths contained in tanks, or by brushing or flow coating the work with portable hand equipment. Typical process sequence and equipment requirements are shown below:

MULTI-STAGE POWER WASHER FOR SPRAY GRANODIZING



IMMERSION TANKS FOR DIP GRANODIZING

PROCESS SEQUENCE

1. Clean
2. Rinse
3. "Granodine"
4. Rinse
5. Final Rinse

NOTE: Equipment can be of mild steel throughout, except in the Granodizing stage, where nozzles, risers, and pump impeller should be of acid-resistant material.

MANY APPLICATIONS

Automobile bodies and sheet metal parts, refrigerators, washing machines, cabinets, etc.; projectiles, rockets, bombs, tanks, trucks, jeeps, containers for small arms, cartridge tanks, 5-gallon gasoline containers, vehicular sheet metal, steel drums and, in general, products constructed of cold-rolled steel in large and continuous production are typical of the many products whose paint finish is protected by "Granodine".

CHEMICALS ACP PROCESSES

WRITE FOR FURTHER INFORMATION ON "GRANODINE" AND YOUR OWN METAL PROTECTION PROBLEMS.

CHEMICALS ACP PROCESSES

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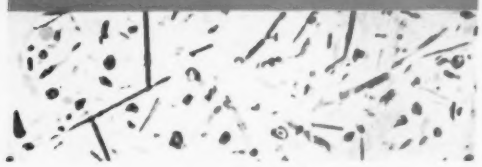
high

AZO ZZZ-22

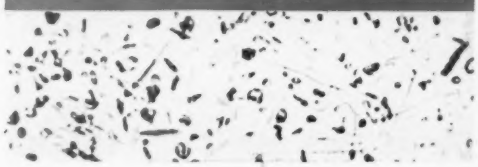
A high oil absorption Zinc Oxide having large Acicular Particles which gives heavy body



medium

AZO ZZZ-11

A medium oil absorption Acicular Zinc Oxide imparting exceptional weathering qualities to exterior paints

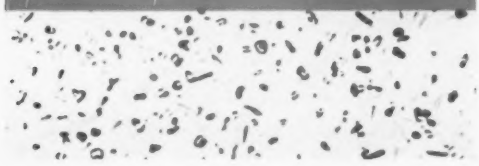


AZO acicular lead-free zinc oxide is a superior pigment available in a wide range of oil absorptions

low

AZO ZZZ-33

A definitely Acicular type with a lower oil absorption, but chemically identical with AZO ZZZ-11 and AZO ZZZ-22



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